THE SPLENDID BOOK OF STEAMSHIPS

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THE BOOK OF THE SHIP.
BRITISH LOCOMOTIVES.
ROMANCE OF THE SUBMARINE.
THE WORLD'S AEROPLANES AND AIRSHIPS.
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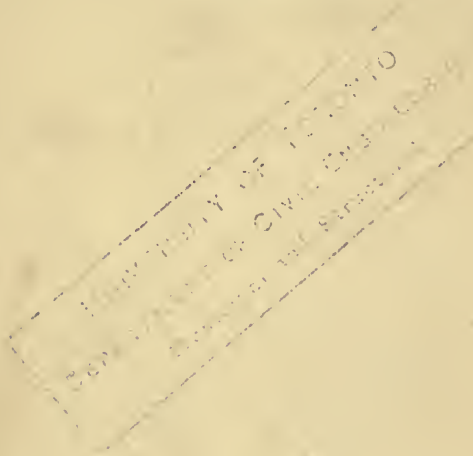
PASTIMES, HOBBIES AND SPORTS FOR BOYS.
FROM POST BOY TO AIR MAIL.

THE SPLENDID BOOK OF AEROPLANES.
" " " " ENGINEERING
" " " " STEAMSHIPS.
" " " " LOCOMOTIVES.
" " " " BOYS INDOOR GAMES AND PASTIMES.

THE SPLENDID BOOK OF STEAMSHIPS

BY

G. GIBBARD JACKSON



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FOREWORD

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THE SPLENDID BOOK OF STEAMSHIPS

I

FROM SAIL TO STEAM

I WANT to tell you how the steamship came and how it grew as simply as possible, omitting nothing which really matters and yet keeping my narrative free of long strings of uninteresting figures and details.

I am drawing out the pedigree of the steamship in the fashion with which our school histories made us familiar. In so many ways and from so many directions did constant improvements come in the growing steamship that I have had to excise many names and dates from the "family tree", but we shall

take them all in as we go along. The dates and names on that tree indicate the more important developments.

Now for the story proper, but not beginning, as you would perhaps expect, at the first date on the family tree.

I think first we ought to trace very briefly, from the very earliest point, the manner in which the ship had come along to the point when she was to take aboard the new and powerful agent of steam. Then we must just look, for the moment, at the manner in which the steam engine had come along to the point when it was ready for the ship. Then, from those converging points, we shall go steadily along to see how the steamship grew up both on the mercantile and the naval side.

How did the first ship come? Here is a theory. Let us suppose a venturesome boy is watching a log floating down a stream. He swims out to it and gets astride, and time after time he is thrown

off into the water because it is so unstable. What then? May we not suppose that the father of the boy, seeing the exploit, began to think how that log could be made something more than a toy?

The next step would be to scoop out the centre of the log until we see the first dug-out canoe in being. Then would come the discovery that it could be propelled by a board, which in turn would become a paddle, or perhaps a pole was used to push it up the stream —we may be sure that the first journey would be the easy one down. Later would come some sort of a sail, and when this was used we had really, in those very far-off days, the essentials of the vessel which reigned supreme until, say, eighty years ago.

The next step would be the evolution of the heavy log into a canoe built up of either bark, or thin wood, or even perhaps strong grasses treated with fat

to make them waterproof. In the birch canoe of to-day we have the direct descendant of that type of vessel. From the navigation of rivers the step to coast-line voyaging would be easy, and then, as the still very miniature craft grew, we should find the braver souls putting forth to another point of land which they could probably glimpse on the horizon.

Our Bibles tell us that the laws of navigation were well understood in the times of Solomon, and it is really a point worth noticing that, going still further back in Biblical history, Noah's Ark was of practically the same dimensions as the average sailing ship of a century since. Of the Ark we may simply say that we must consider her as the ancestor of the present-day houseboat, since she was not intended to travel.

Passing rapidly on, we find the ancient Phœnicians, Greeks, Egyptians, and Romans all intent on improving the ship. By this time the galley had come along,

and, owing to the uncertainty of the wind, for a long period the method of propulsion was by oars. Slaves were cheap, so hundreds of men were cooped up between the decks of the galleys—tier upon tier of naked men working for dear life under the lash of cruel taskmasters, who walked to and fro along the decks of these horrible vessels.

Many of these galleys had sails as well; some had sails only. We know that years before the Christian era these galleys reached the coasts of Britain, and tradition says that they went round Africa too.

The paddle-wheel steamer is gradually disappearing. Here we find an idea still in being which was known to the Chinese and the Romans, only the medium employed for driving the paddle-wheels was men instead of steam.

Coming rapidly along, we look with amazement on the beautiful Viking ship, of which here and there examples have

been found and are on view. One can be seen at Christiania University to-day.

In the Middle Ages generally speaking, the sailing ship was used in the exposed northern waters, such as the North Sea, whilst the oar-driven galleys abounded in the Mediterranean, where conditions greatly favoured manual power.

One of the principal uses of the galleys was for fighting—they were, in fact, the naval vessels of the period, though, of course, they were used for commerce as well.

The introduction of cannon played an important part in the growing up of the ship, or rather the galley. Although the first cannon were comparatively small, they had the effect of making the galleys top-heavy, and from this cause many fine boats were lost. To counter this tendency to top-heaviness the galleys were built with a greater beam, and at the same time the sides were made to slope inwards. This form of construction is traceable right down to the ships

"Charlotte Dundas"
The first practical British steamboat, built in 1802, but killed by prejudice.

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"CLERMONT"
Robert Fulton's famous pioneer Steamboat on the Hudson River.

of Nelson's days. The beam of the galley was roughly from one-third to one-fourth of her length, but this has been gradually altered in the ship until the average now is about one-tenth.

You may be sure there was a good reason for building the ancient galleys in this beamy fashion. We find it due to the desire to have vessels which would not break their backs in a heavy sea. The strength of wood is very limited, and this our forefathers fully realised. Only within the last eighty years, or so, has the ship grown in length, due mainly to the coming of iron and steel.

From the galley to the galleon of the Spanish Armada came a steady growth with the same practical lines as regards hull—the galleon being simply in effect a huge galley. On the galleys miniature castles were erected at either end for the fighting men to do their part, and these castles became greatly exaggerated in the ships of the Spanish Armada,

forming splendid marks for those magnificently-handled, wasp-like craft in which Drake and his captains fought.

Right down to the 'fifties of the last century the wooden warship, having lost its castles, retained its immense freeboard, with deck upon deck of guns. They, too, offered a good target, but built as they were of good oak, the guns of that period simply plugged them through and through without greatly endangering them.

What did matter in warfare was the amount of destruction done to the masts and rigging. That, briefly told, is the development of the naval sailing ship. And it was to battleships much resembling those which fought at Trafalgar that the steam engine was first fitted, in a manner which rather savoured of great uncertainty and disbelief in its effectiveness.

The mercantile ship grew up on rather different lines, improving greatly in

sailing power from the middle of the eighteenth century until the 'sixties of the nineteenth.

The last word in the sail-driven ship was the clipper—magnificent examples of British and American shipbuilding—and quite the flier amongst ships until the all-conquering giant, steam, was fairly let loose amongst them.

Of the clippers engaged in the China tea trade there are many remarkable stories told, to which, were this not the story of the steamship rather than the "wind-jammer", I should like to give space.

For some years after the coming of the steam-driven vessel the clippers held their own on the China trip, and time after time they beat the steamer on the homeward voyage when the wind favoured them. But when the wind was fickle, then the poor "wind-jammers" were quite out of it.

Finally, the opening of the Suez Canal in 1870 put finis to their more important

duties. What were left of them became the equivalent of the present-day tramp steamer.

A public-spirited Cornishman has brought back the famous clipper, called the *Cutty Sark*, from foreigners, and is intending to let her end her days in Falmouth Harbour, rigged as she was in her prime.

Now we must briefly tell of the way in which the steam engine progressed to the point of being ready for the work on the sea.

We should have to go right back into the very distant past to get at the source of the steam engine, but it is very interesting to learn that the modern steam turbine, which plays such a leading part in the present-day speedy vessel, is a direct descendant of the curious little model made by Hero of Alexandria, about 2,000 years ago.

Then we have the experiments of hosts of well-known men, such as Papin, Newcomen, Savery, and Worcester, who

brought crude attempts at steam-driven machinery to the point where Watt could add, not perhaps the finishing touches—they are not yet—but at any rate the touch of reliability and economy in the use of this potent genii.

It is very interesting to see how the locomotive and the marine steam engine seem to march together from the period of Watt's really effective stationary engine. The latter was being largely employed on the pumping of water from the mines, and particularly in winding up the cages containing coal, at the end of the eighteenth century.

Proposals were made to Watt that he should turn his thoughts to making a marine engine and also a locomotive. Watt shook his head, and by some it is said that he pooh-poohed both ideas, saying they were quite impracticable. I cannot find any proof of this, and I think we should be more nearly correct if we assumed that Watt had not the

time to go into the question of the development of either proposal. Having made such great advances in the construction of the stationary engine, Watt was hardly the man to throw cold water on further development.

It was a pupil of Watt—Murdoch—who made the first model locomotive in 1784. From this point progress in locomotive practice and marine development may be said to have kept pace for a period, though, of course, the speed of the ship has never equalled that of the locomotive, though in strict proportion it has increased within late years to a far greater extent.

Having brought ourselves thus far on the two roads of the ship and the steam engine, we are now in a position to see how the latter, applied to the ship, led to the most wonderful revolution on the sea, bridging great wastes of water and making for peace and progress as nothing had done before.

II

THE FIRST STEAMERS

It has been well said that steam has been the greatest agent in bringing about a better understanding between nations, whilst, again, steam has completely revolutionised warfare afloat. If you will now turn to our "family tree", you will find our first date of moment under 1736. At this period the stationary steam engine was in a crude state, and we shall not be surprised to find that Jonathan Hulls's experimental steamer had but a short life. All the records I can find of it are very meagre in details, but, as we must start our "family tree" somewhere, I think we can reasonably accept this as a definite starting point in the growing up of the steamship.

Hulls took out a patent in 1736 for the making of a steamship, whose duty would be to act as a tug. It is not quite certain that the vessel was actually built, though one account says that the boat was built, fitted with a rear paddle-wheel, and tried as a tug.

In any case the design could not have been really successful, or we should not have had to wait practically a half-century before we got another step forward. We can say that Hulls ranks with Murdoch of the locomotive in that each designed something the world was waiting for, and each appeared to have left the work of development to others.

Still pursuing our parallel of the growing-up of the locomotive and the marine engine, we find that the next effort in both directions belongs to France. In fairness to *La Belle France*, Cugnot's steam carriage deserves to rank before the achievement of Murdoch, though again it is only fair to say that the Scots-

man had probably never heard of what Cugnot did just before Murdoch's model locomotive was set running.

Thus, soon after Cugnot had made his experiments with his steam carriage (two were built, and one of them is now preserved in a Paris museum), the Marquis de Jouffroy placed a steam-driven craft on the Saone in 1783. Here we have two paddle-wheels employed driven by a single horizontal steam cylinder.

Beyond drawing the attention of many inventors to the possible use of steam for small craft—no one imagined at that period that large vessels would ever be steam-driven—nothing further seems to have been done in France in this direction. Having shown the way, it seemed as if France was content to let others take up the running.

I want here to stress the fact that the paddle-wheel as a means of boat propulsion had been fully understood for hundreds of years. There was, however, one

great difficulty in the way of its extension as the force brought to bear was the sum of several pairs of hands. Originally, two or three men would be placed at a cranked handle and this they would turn, but in later vessels of the paddle-wheel type a capstan was used. Here, again, the number of men who could be employed was limited, therefore the size of the ship was limited.

An interesting survival of the cranked handle-propulsion may be seen at some seaside resorts. At Ryde, in the Isle of Wight, there is a canoe lake on the sea front, and one of its chief attractions for the younger generation are the numerous hand-driven paddle-wheel canoes. These develop a really surprising speed in capable hands, and canoe races are quite the fashion. That is a link with the past and the pre-steamship days which may last some time.

Four years after the experiments made by the French marquis, a Scottish banker

was interesting himself in mechanical propulsion of vessels by means of the hand-driven paddle-wheels. This was Patrick Miller, and he got so interested in the question that he considered whether he could not go a step farther and substitute steam for manual power. In Symington he found a sympathetic listener. So it came about that the latter designed and built an engine which was fitted to a craft 25 ft. long, with a 7 ft. beam.

The boat was a curious affair, made up of a pair of hulls. How do you suppose the paddle-wheels were placed in this curious craft? You would expect them to be fixed one on either side of the double hull, or at least side by side in the space which intervened. Instead of this we find them placed tandem fashion one behind the other. The engine was geared with chains.

This unique vessel was tried successfully on Dalswinton Loch, and considerably

astonished the spectators when it attained a speed of five miles an hour.

Patrick Miller was so satisfied that steam was the reliable propelling force for boats that he went a step farther. He purchased a canal boat for use on the Forth and Clyde Canal, and Symington designed a much more powerful engine than had been employed in the dual-hulled steamer. The new machine developed 12 horse-power. This engine was built by a firm which is still in existence and still very well known—the Carron Iron Company.

Profiting by the experiments already made, the paddle-wheel was placed at the stern and a connection made to the engine by means of a rod and crank. The speed obtained approached seven miles an hour, and at this speed quite a respectable load was taken.

There are many canal boats nowadays which are steam-driven, but we may notice in passing that the speed remains

much the same as that shown by this pioneer.

Here, again, we have to note that for a time the experiment seems an isolated one, and we are left wondering why such a successful attempt at navigation was not followed up.

We have to go ahead into the nineteenth century to note the next step in the life history of the steamship. If you refer again to the "family tree" you will notice an entry *Charlotte Dundas*, and date 1801.

Lord Dundas was the chairman of the company who owned the canal upon which the joint production of Miller and Symington was running. Lord Dundas had not been oblivious to the delays which occurred through the horse-working of the boats through the canal, and he at once felt that the new steamer was the possible way in which the horse could be superseded. He, therefore, commissioned Symington to try again

and bring out an even more powerful vessel than the converted canal boat appeared to be.

The result was the *Charlotte Dundas*, built at Grangemouth. Like the pioneers of her type she had a stern paddle-wheel, and it is interesting to find that she had a double stern with two rudders, the latter controlled by a wheel placed well forward. When tested she proved an exceptionally strong craft, towing two loaded sloops weighing 70 tons with ease. These sloops she took nearly twenty miles on the canal.

Despite the undoubted success of the *Charlotte Dundas* she was shortly withdrawn and laid up in a creek, where for many years she proved an object of interest to the curious. Many of the latter went their way with the impression that they had looked upon a new-fangled boat which was an evident failure, else why laid by to rot? Instead of there being any question of failure in the boat

itself, the same reason operated against her then which still operates on many of our canals, thus rendering them almost valueless.

The wash from the paddle-wheel of the *Charlotte Dundas* began to tell on the banks of the canal. The directors grew alarmed, foreseeing that a new waterway would soon be necessary if there were an increase in steamers. So steamers were not allowed.

III

STEAMBOAT DEVELOPMENT IN AMERICA

THE next date on our " tree " is 1807, and to see what Fulton's experiment really was we must cross, in imagination, the " herring pond ".

The vast territory of the United States was being opened up at a rapid rate from the year of Independence. There were many magnificent rivers, which proved a far easier means of communication than by crossing the trackless prairie. Therefore we are not the least surprised to find our American cousins turning seriously to steam navigation.

As far back as 1791 the United States Legislature granted no fewer than four patents for the use of different forms of steam propulsion for river craft. Two

THE EARLY BRITISH BATTLESHIP "ALEXANDRA"

She was a fine old vessel of the muzzle-loader days with the masts and sails which were thought necessary before the Navy had accustomed itself to reliance on steam.

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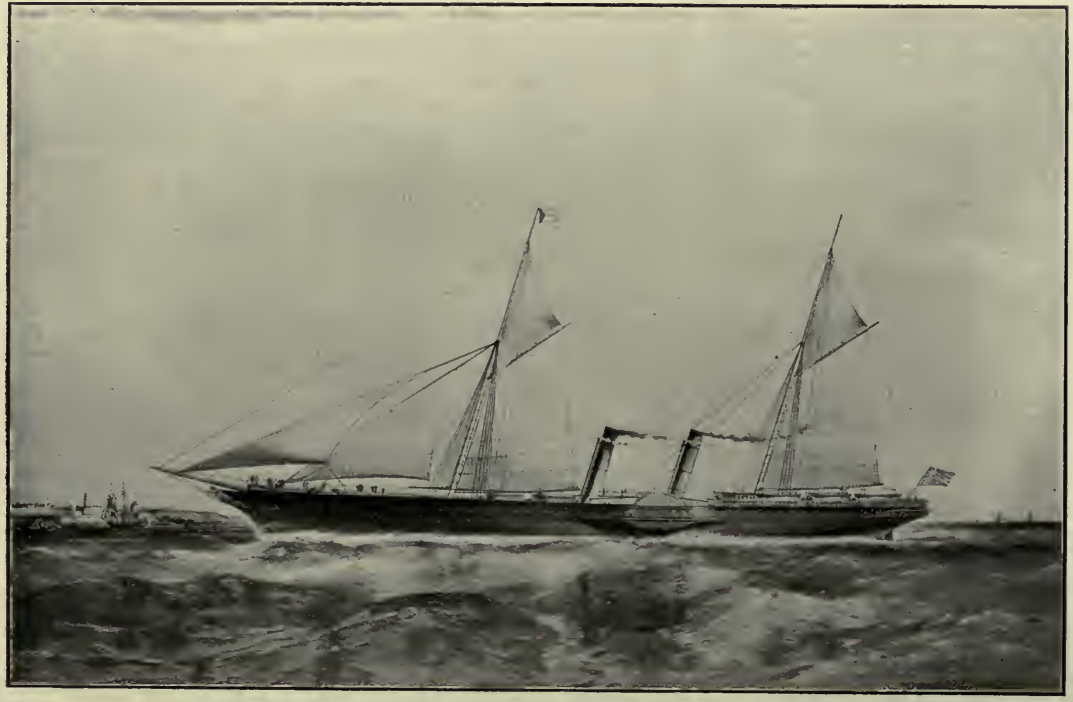

"Delta"

One of the last and one of the finest of the P. & O. paddlers, which had an extraordinary career after she was sold by the Company.

years later John Fitch had a curious little boat running on the Delaware river. This was a paddle-wheeler.

A little later on John Stevenson had a queer craft running on the Hudson; as originally built, we learn that it had paddle-wheels and a propeller—the latter probably the forerunner of the now universal screw propeller. After considerable experiment Stevenson seems to have decided that the paddle-wheels might be dispensed with by adding another screw. I ought to mention that this early form of propeller had little real resemblance to the kind which came into service some half a century later.

A famous vessel which Stevenson built with the aid of his son was the *Phœnix*, which had the distinction of being the first steam vessel to attempt a sea trip, voyaging from New York to Philadelphia.

Another pioneer in steam navigation was Henry Bell, a far-sighted Scotsman, who quickly made up his mind that steam

would be the driving force on land and sea. With the latter he was greatly concerned, but few men had to put up with so many cold douches as Bell. Circumstances did not at first allow him to experiment in a practical manner, so he tried to do what many men do nowadays, i.e., to get the people who really matter interested in the subject. This he attempted by correspondence and by writing to the Press.

He was one of the first to approach Watt, whose name was now well before the public as responsible for many great improvements in the stationary engine. Watt could not be bothered—nor could the British Admiralty be moved to listen to what Bell had to say. Still, not to be turned from his purpose, Bell had another shot at the Admiralty, and this time the great Lord Nelson took up the running, pointing out that if we did not apply ourselves to the problem of steam navigation other nations would and we might

conceivably lose the command of the sea.

Still Britain remained unmoved and Bell began to carry his ideas to foreign governments. Here, except that the American Government seemed rather more interested, Bell's efforts were also wasted.

Already, as we have just seen, experiments were under way in the States, and to further investigation the Government deputed Robert Fulton to correspond with Bell. Strange to say, the two men were already well acquainted, Fulton having visited Bell on several occasions. We may be quite sure that Bell fired the imagination of Fulton, and to such good purpose that in 1807 Fulton had his first vessel running on the Hudson.

So far steamers on American waters had been experimental, but with the coming of the *Clermont*, real success was achieved. We have some interesting details of this little vessel, which is said to have greatly alarmed some Dutch

settlers on the banks of the Hudson. They saw, one night, an apparition advancing up stream, breathing forth smoke, sparks and steam. No wonder these simple people thought the Evil One was coming their way! Without more to do they left their farms and bolted into the forest, there to remain until daylight brought them a greater courage.

The *Clermont* was 130 ft. long, with a beam slightly exceeding 16 ft. She had side paddle-wheels, but on American rivers her descendants seem to have copied the *Charlotte Dundas* with a stern wheel. The great advantage found in the latter type is that it is possible to protect it against damage, and that it draws very little water, thus enabling a river steamer to negotiate very shallow portions of the stream.

Although the *Clermont* was a success, it would appear from contemporary records that a considerable amount of re-building, etc. had to be undertaken.

One authority states that her engine came from England—from the firm of Boulton and Watt—and this is very probable, since engine building would not be a well-established industry in the New World at this period.

We will now look, for a moment, at another part of America where the steamship had commenced to run. This was in Canada, on the St. Lawrence. Here the *Car of Commerce* was launched, and plied, from time to time, between Quebec and Montreal. In his book on " Ocean Railways " Mr. Fraser Macdonald tells a little story of this steamer which illustrates the awe with which these early vessels were regarded.

The engineer of the *Car of Commerce* was, as we might expect him to have been, a Scotsman. One day on the short voyage he was found to be missing. Port was almost reached, and without Sandy the engine could not be stopped, for no one dared to touch the weird machine.

They searched high and low, and still no sign of the engineer. Meanwhile there was nothing for it but to cruise up and down outside the harbour, much to the amazement of the onlookers ashore.

At length Sandy was found asleep in an unexpected corner and was very rudely awakened. When taken to task by his captain the old Scot replied: " If ye had put the fires oot she'd a stoppit herself." And that was all they could get out of the engineer.

IV

FROM RIVER TO SEA

In Britain, Henry Bell had so far succeeded in his efforts that he had his *Comet* running in 1812. This little craft was a great advance on her forerunners, and was employed on a regular passenger service on the Clyde. The *Comet* was 40 ft. long with a beam of about 10 ft. Her engines developed 4 horse-power, which gave her a speed of eight miles an hour. The paddles were rather remarkable, being of the malt shovel variety.

I think we may say that just as the *Rocket*, seventeen years later, made for certainty in the growing up of the locomotive, the *Comet* did likewise for the steamer.

In a very few years after the advent of Bell's steamer there were many sister vessels on the Clyde, and other rivers had begun to turn their attention to the new form of transit.

London had steamers in Waterloo year; the same month in which that great battle was fought saw a tiny steamer, the *Elizabeth*, making a trip from the Clyde to Liverpool.

When we learn that her crew consisted of only three boys, and that they won through two gales and managed machinery of which many grown men stood in awe, we feel like giving them a cheer. One of them had sea experience as he was a young naval officer, but he must have been quite unused to a steamship.

The next step was to place the steamer on cross-Channel services, but here again prejudice died very hard. The engine was looked upon merely as an auxiliary to sails, and, except in calms, steam was only used to get the ships in and out of harbour.

The true British sailor of that period looked upon the steam-driven craft much in the same way as our London cabmen did the first taxicabs—a rather amusing machine when not dangerous.

Now came the question of steamships for ocean transit, and here the Americans take premier place with their *Savannah*, which first crossed from the States to Britain in 1819. She took a full month to do it, and thus exceeded the time taken by many sailing vessels. When, however, we learn that the engine was in steam for only eighty hours of the crossing, we must allow that the *Savannah* was far more a sailing than a steamship, and, in point of fact, she returned the whole way under sail. Her paddle-wheels were built upon a principle which allowed of them being hoisted inboard when dirty weather approached, or when fuel ran out. But we must mark this American vessel down as a pioneer, even if we do not allow the whole claim. All credit to her as the

first of that brilliant company of trans-Atlantic steamships.

A claim is made that Lord Cochrane built the *Rising Sun* in 1818, and this vessel was the first to cross the Atlantic. The claim is not, however, generally admitted, and I find no definite details of the ship.

That the *Savannah* was not quite a success as an auxiliary steamship may be gathered from the fact that she was converted to a sailing vessel a short time after her momentous voyage. It is said that on approaching the Irish coast with smoke pouring from her funnel the look-out ashore decided that she was on fire, and a revenue craft of good speed was sent out to aid the hapless vessel.

To the amazement of the crew of the swift cutter they could not come up with the " ship on fire ", which, strange to say, appeared to be getting along quite comfortably almost under bare poles!

Highly suspicious of the stranger, the cutter sent a shot or two across her bows, and she was at last hove to. You will say that the cutter's people ought to have known that she was a steamer, having regard to the fact that steam was fairly extensively employed. But here we must recollect that the greatest authorities of that day were agreed that steam could never be effectively employed for ocean-going vessels. The *Savannah*, though not a large vessel, was much bigger than any craft on which steam had been previously employed.

Six years went by without any special development, and then, *vide* our " family tree ", we find an entry of the *Falcon*. This was a tiny vessel of 176 tons—a tonnage reached by many a river boat to-day.

The *Falcon* made the voyage to India, via the Cape of Good Hope, and thus laid the foundation of a steamship service to our great Eastern Empire. She

was followed, in the same year, by the *Enterprise*—a vessel almost three times her tonnage. Both these vessels helped forward the growing-up of the steamship, because they clearly demonstrated that steam could be utilised on a very long trip.

But we must not overlook the fact that, as in the case of the *Savannah*, steam in these boats was purely an auxiliary agent and not the regular source of propulsion.

Just as to-day you will see many sailing craft fitted with an auxiliary motor to save loss of time when the wind is light, so were the first steamships of the period at which we are looking fitted with an auxiliary means of progress through the seas. Only when it became worth while were engines set going to aid the sails.

One other step forward we must notice as proper to the 'twenties of the last century. This was an entire change in the lines of the hull of the steam-sailing-

ship, if I may coin a term for so describing these hybrid vessels.

David Napier had noticed what very heavy weather the old blunt-nosed sailing vessel made of it. If to-day you compare the bows of the ordinary canal boat and the smart little steam launch you will be able to realise in what the revolution consisted. The ship before Napier made his experiments had the canal-boat nose —afterwards the steamer's hull became similar to that of the present-day steam launch.

Not only was Napier's idea copied for most of the coming generation of steam-ships—or steam-sailing-ships—but also for the fastest wind-jammers.

Without in the least intending it, Napier gave us the famous clipper type of ship, which for many years—until the opening of the Suez Canal, in fact—was a serious rival of the young steam-driven vessel.

The name clipper is said to have been given to this type of stem because it

clipped through the sea instead of pushing a blunt nose into it, which only retarded forward progress.

The clipper bow is still seen on many of our finest craft—both steam and wind driven—but in the case of the steamer it is now more usual to find the straight stem.

We must now leap forward another eight years and see how the Canadians added lustre to their seamanship by building the first British steamer to cross the Atlantic. This was the *Royal William*. The latter was built at Quebec, but her engines came from Boulton and Watt, of Birmingham. By noticing very briefly her dimensions we see that the steamship was indeed growing up.

The *Royal William* had a tonnage of 830, length 176 ft., breadth 27 ft., breadth across hull and paddles 44 ft., and draught 13 ft. She had a freightage capacity of 300 tons, and her passenger accommodation provided for 60 persons. When

we read that 3,000 persons are often nowadays carried across the Atlantic in a single hull, we can only say with Dominie Sampson, " Prodigious! "

The *Royal William* left Quebec on her first voyage across to London on August 5, 1833, and she made a good, if slow, crossing by arriving off Gravesend on the 11th of the following month. Such a lengthy trip did not augur well for future steamship enterprise, because the clippers were doing the run in many days less, but there were occasions when the wind-jammer took considerably more and caused great anxiety to owners and passengers and the friends of the latter.

The *Royal William* is also historic in the fact that by her sale to Spain at a period when that country had some little trouble on, the Canadian steamer became the first steam warship sent on active service. All honour to the Spaniards, who saw before our own Admiralty what a valuable asset a steam-driven warship

would be. The Spanish Government were also wise enough to secure the services of her Scottish captain, and as many of the crew as would sign on.

It is said that her end came some forty years ago, when a vessel which answered to her description was lost on the rocks near Alexandria.

At last Britain woke up to the fact that if she were to retain any prestige at all she must make an effort in steamship building. Mainly at the instigation of an American, resident in England, Dr. Junius Smith, a company was formed with the title of the "British Queen" Steam Navigation Company.

Their first concern was to build a good steamer bearing the name of the company or, to be accurate, the first two names of the company. There were many difficulties encountered, and it did seem that the scheme and company would fail. What stirred them to fresh effort was the knowledge that another company was

also building a vessel to cross the "herring pond". Determined to be the pioneer on the Atlantic the "British Queen" company chartered the *Sirius*, a vessel resembling the *Royal William* in general dimensions, but possessing nearly double the horse-power of the Canadian ship.

The *Sirius* was never intended for a long ocean voyage, having been built for trading between London and Cork. When it was proposed that she should attempt such a voyage, and at such short notice there arose certain difficulties with the crew, and after her sailing, on April 4, 1838, there was still more trouble. Like the crew of Columbus, many of them were on the point of mutiny and desired the captain to turn back. But their pleading did not move the tough naval officer, Lieut. Roberts, who had behind him the training and tradition of the British Navy. Of what use to tell such a man that the voyage would never come to an end—save at the bottom of the ocean—when

the word "impossible" was not found in the service in which Drake and Nelson did their part?

Storms came soon after the start, and there were many aboard that small steamship who felt that the chance of seeing America was not worth a biscuit toss.

V

THE BEGINNING OF THE ATLANTIC FERRY

HARD on the heels of the *Sirius* was the rival ship, the *Great Western*. When I tell you that the designer of this ship was the great Brunel you will not be surprised to know that she was greatly in advance of anything turned out up to that date.

Those of you who know anything of railway history will not need telling of the generous fashion in which Brunel built the Great Western Railway, and of how the speeds on it were to exceed anything attempted on the narrow gauge lines.

The Great Western Railway was being laid whilst the ship of that name put to sea, and we can imagine that Brunel had

his hands full between the two big undertakings.

The dimensions of the *Great Western* were as follows: Length 236 ft., beam 35 ft., depth of hold 23 ft., gross measurement 1,340. Her engines had two cylinders with a diameter of 73½ ins. and a stroke of 7 ft. These gave the engines a nominal horse-power of 750. The paddle-wheels were huge affairs, 28 ft. in diameter, with blades 10 ft. across. Her saloon provoked the Pressmen of that day to similar language to that used in describing the wonders of the *Leviathan* to-day. Its dimensions were 75 ft. by 21 ft., and a height of 9 ft.

The *Great Western* started from Bristol three days after the *Sirius* had got away from Cork. Although it might be thought that the long start of the latter prohibited this contest being anything in the nature of a race, it actually resolved itself into such an affair. In the first place the *Sirius* was very much over-

loaded, and then she was admittedly a slower and much less powerful vessel.

Although there was no cable or wireless, the news of their coming had been sent to America by sailing ship, and our cousins across the water had reckoned up the speed of the vessels to gauge the day of their arrival. On this day thousands were congregated on the highest land. Day after day went by, and the Jeremiahs went round with long faces, saying "What did we tell you? You cannot fly in the face of the laws of Providence! The ships are either blown up or consumed with their own fire." And so on —you know the kind of people.

Of course, these watchers could not know that, right across, the seas had been stormy and that both vessels had to battle against adverse conditions generally; the engines were new and the men aboard were not familiar with their working. All these things reduced speed.

At last one day a shout went up from

a watcher: "Smoke on the horizon." Some said "yes," others that it was a bird. How tensely that smudge was watched until there could be no doubt about it!

It was the gallant little *Sirius* opening up one of the greatest chapters in this world's history. We learn that the church bells were set ringing, cannons fired, and boats shot out from the shore to greet the tiny steamer. Within a few hours all this had to be repeated, for the *Great Western* was heading up the harbour.

So ended the first great steamship race across the Atlantic. Nominally the honours were to the *Sirius* as the first ship to arrive, but in actual steaming time the *Great Western* won, taking what was then the remarkable time of fifteen days for a voyage of 3,125 nautical miles. The *Great Western* burned 30 tons of coal a day.

It is interesting to find that the *Great Western* became one of the first steamers of the Royal Mail Steam Packet Co., but,

owing to the rapid strides which were made in shipbuilding, and particularly in marine engine development, she was sold to shipbreakers a few years after her famous first voyage.

The *Sirius* was turned over to the Irish services, for which she had been built, and was subsequently wrecked on the coast of Erin. People seemed to help themselves to the cargo and to whatever portions of the ship which could be taken away. Thus, we learn that her main shaft was utilised in the machinery of a mill, whilst her bell summoned the good people of an Irish village to their devotions. Fifty years went by, then the remains of the famous steamer were bought by a salvage firm, who made souvenirs from what was left.

The *British Queen* comes next on our list. When ready she took the place of the *Sirius*, and after a short spell as a liner she was sold out to a Belgium company. It is said that her sale came about

because the sister vessel, of practically the same design, named the *President*, disappeared mysteriously on her voyage back from the States—this after a successful passage to America. As she was lost with all hands and there was no wireless to tell of her distress, we can only assume that she ran into an iceberg and foundered very quickly. The Atlantic was not then crowded with vessels, using what are called definite steamship " lanes ", so it is possible that if her boats did get away, they were lost in the next storm.

Now, looking back again to our " family tree " we come to a very important date —1840—and with it the name *Britannia*.

The *Britannia* was the first steamer of a little line which has steadily grown, until to-day it has a commanding position, not only amongst our own companies, but throughout the world.

A thought must have often come to my readers, something in the following

fashion: "How did these big steamship companies get going? Who was the first man who thought about these big fleets?" That is a question I shall try to answer as we come to the origin of our most famous lines of steamships. In most cases we shall find quite a wonderful romance surrounding the beginnings of fleets whose names are now world-wide, and if we are able to gather a lesson from these beginnings, it is certainly one of true British pluck, for set-backs were numerous.

As far back as 1830 Samuel Cunard planned a steamship line between England and America. Cunard was the agent of the Honourable East India Company at Halifax, Nova Scotia. He had followed closely the experiments which had been made in steamers, and he was fully convinced that the regular crossing of the Atlantic by a fleet of steamers was bound to come. He thought and believed in such a thing when nine men out of ten were frankly incredulous.

In 1838 the British Admiralty, though by no means impressed by the steamer for warfare, had come to the opinion that for the carriage of mails it was both quicker and more reliable. I ought, perhaps, to explain that up to the middle of the last century the Admiralty were responsible for carrying all sea-borne mails, running their own vessels where necessary.

The Admiralty therefore, advertised the fact that they were prepared to give a contract for the conveyance of mails by steam between this country and America. Here was Cunard's chance, and he came home to see what could be done. He had no money, and the people he at first approached with the idea of forming a mail steamship company said, " Sorry, but this is a wild-cat scheme, and we have no money to put into it." Most men would have said good-bye to their project—not so Cunard.

At last he was listened to by two hard-headed Scotsmen, Burns of Glasgow, and

McIver, of Liverpool. They went all out with Cunard in raising what seems to us a small sum for a company who must own at least four ships to fulfil the contract. This was £270,000, a sum which would not buy a second-rate liner of to-day. The money obtained, the trio went ahead and placed contracts for the four vessels on the Clyde.

The Mail contract was for seven years, and it worked out at about £3,300 for the voyage to the States and back. With such small ships as were laid down it followed that the mail subsidy would defray a great deal of the cost of the running. If only a moderate number of passengers were carried and a small amount of the best paying kind of cargo available, success was assured—always supposing the steamship could rise to the task.

The directors of the new company, which at first rejoiced in the high-sounding title of "The British and North

American Royal Mail Steam Packet Company," determined that their ships should be of the best. It was necessary to win the confidence of the public; to win confidence meant the very best ships obtainable. I need hardly say that their hulls were of wood, and that they were driven by paddle-wheels.

Iron for shipbuilding had not been introduced, whilst the screw propeller was still in the experimental stage. The names given to the new fleet were *Britannia*, *Acadia*, *Columbia*, and *Caledonia*. Let us look at the dimensions of these midgets. Length 200 ft., beam 34½ ft., depth 22½ ft., tonnage 1,154 tons, and indicated horse-power of 740. The accommodation was described as being for 115 cabin passengers. Second and Third (or we may write steerage for third-class) were not carried on Atlantic steamships for many years. Either you travelled first-class or you went by a wind-jammer.

We note, too, that a cargo space for 225 tons was provided. The four new liners had two decks each, speed of 8½ knots, with a coal consumption of 60 tons per day. Seen out of the water the paddle-wheels were enormous, having a diameter of no less than 28 ft. The blades numbered 21. What kind of paddle-wheels should we be using to-day supposing the screw propeller had never passed the experimental stage? I think we can say the steamship would have ceased to grow had the paddle-wheel remained the propelling force. We certainly cannot imagine the *Olympic* say—a vessel roughly forty times the tonnage of the *Britannia*—having paddle-wheels anything like forty times the size of those fitted on these pioneer Cunarders!

On July 4, 1840, the *Britannia* swung out of the Mersey on her first voyage amidst wonderful scenes of enthusiasm.

How little did those pioneers think of what the Cunarders of the future would

be? We read that " the fine vessel is so large that it is necessary to swing her out into mid-stream and place her passengers aboard from a tender owing to her immense size."

Here we mark the introduction of the tender in connection with the sailing of liners. The tenders of to-day are approximately the same size as the *Britannia*.

The *Britannia* accomplished her first voyage in 14 days 8 hours, and she had a rousing reception at Boston—the American terminal port for the new mail services.

Four years later the Boston people showed the *Britannia* practical sympathy by cutting a channel seven miles long for her to proceed to sea, a sharp frost having made her ice-bound on arrival.

Right from the first the Cunard had been a cautious line, leaving to others the task of experimenting, then building something better if the experiments provided for an advance. I mention this

policy here because as we go along you will repeatedly notice how the Cunard appeared to lag behind in the point of speed and steamship development. You will also notice that the Cunard came in all right at the proper time.

One result of this policy was the proud boast of the Cunard, up to 1914, that they had never lost a passenger's life. Think of the care and thoroughness which was expended to attain such a marvellous record? The war years cut across this fine record, but that was inevitable.

The British Government were so pleased with the improved mail service given by the first Cunarders that, in 1848, they decided that the sailing should become a weekly instead of a fortnightly one. Within ten years their fleet was doubled, speed was steadily increasing too but not sufficient yet to occasion much reduction in the crossing. New York had a direct service alternate weeks. On the

fortnightly service Boston and Halifax were served.

In these early days the dangers of the sea were greater than now. Apart from the absence of wireless there were also no cables; breakdowns were more frequent, and the route itself, which involved coming within signalling distance of Cape Race, was dangerous. The latter is on the coast of Nova Scotia, and here fogs abound. One of the four pioneer steamers of the Cunard was lost near this point—this was the *Columbia*.

Another of the later steamers of the 'forties had a very remarkable experience. The *Europa* was approaching the Cape very slowly owing to a heavy mist. Extra look-outs were placed owing to the known proximity of land. Suddenly from the bows rang out a cry " Breakers on both starboard and port bows." In a moment another cry " Breakers ahead as well." The vessel had run straight into a small land-locked bay within a mile or two of

"OLYMPIC"
White Star Line.

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BOAT-DECK OF THE "MAURETANIA" SHOWING LIFEBOATS UNDER DAVITS.

the Cape, for which she had been groping for days on end! There was just room to turn the boat round and head for the open sea. The cause of this near squeak was found to lie in a curious circumstance. The spare compass was brought up for comparison with the one in use, and a third compass differed from the first two.

As most of you know, ship's compasses are very carefully tested before they are brought into use. Many of you will know too, that iron laid in one position for a considerable time tends to become magnetised. A sailor aboard, who had studied magnetism, suggested that the deflection of the compasses had been brought about by their lying near a smoke-pipe. When first fitted this pipe had been of brass, but on the last overhaul of the ship an iron one had been substituted. The sailor suggested that this pipe had become magnetised. On testing it this was found to be the case, so that one of the finest of the Cunard fleet came near to disaster

through a smoke-pipe leading from a saloon! The captain had it taken down at once and overboard it went.

On another occasion the *Europa*, in a fog, cut clean through a barque, and her only damage was the loss of her bowsprit and figurehead. The *Europa* and her three consorts, by the way, had a tonnage of 1,800, whilst the next four, completing the dozen already mentioned had a speed of about 13 knots and a tonnage double that of the *Britannia*.

So you see that within the first ten years distinct progress had been made in ocean steamships, but we must never forget that sails still played an important part as propelling agents. And although the *Britannia* took fourteen days to cross the " herring pond " this time was often exceeded, sometimes running into three weeks, and on occasion four. No messages were received to account for the long trip, and anxiety was often greater over the delayed steamer than would have

been the case had she been a "wind-jammer."

Leaving the further progress of our pioneer Atlantic steamship line for a few minutes, I want you to look again at the "family tree". Here we find the entry *Great Britain*, 1843. With her coming another step in ocean travel was taken.

Once more we find Brunel taking a hand in steamship evolution. When half built Brunel suddenly decided to substitute the engines which were to drive paddle-wheels and in their place he fitted machinery for driving a screw propeller. Thus the *Great Britain* was the first big vessel to have a screw, and from her coming we may trace the fairly rapid change which took place in the method of propulsion.

A still more important point about Brunel's ship was that she was the first iron steamer of any size. The test of iron construction for ships was quickly made by the *Great Britain* going ashore and

remaining there throughout the winter gales without material damage, whereas a wooden vessel would have gone to pieces.

For her day the *Great Britain* was reckoned a huge vessel, having a tonnage of 3,270, horse-power 1,500, length 322 ft., with a beam of 51 ft. Although built for the Atlantic service she was diverted to the Australian trade, where it was felt her size would make her very successful. Somehow the *Great Britain* did not succeed, though why I am unable to say. Eventually she was converted to a sailing ship, and the last I can trace of her career was that she was sent to the Falkland Islands to serve as a coal hulk.

To end as a hulk, usually to store coal for ocean-going ships, is the fate of many an erstwhile flier. In practically every foreign port you will find old hulks, covered with successive coats of tar, their decks smothered with coal dust, their once fine upper fittings removed, including funnels and masts. Under those coats

of tar we might perhaps find the name of a vessel which was known the world over in the 'sixties, 'seventies, or even 'eighties. We may give them a thought as our spick and span liner takes aboard its food from their almost deserted decks, and then a hand-wave as we glide smoothly away.

Here is a relic with the past, and it is more than possible that the deck upon which we stand will take the place of one of these old fellows in the not very distant future.

You will be wondering perhaps, how the Navy has been faring under the wizard we call steam. In a later chapter we shall see how the Admiralty were slowly brought to the conclusion that what was good for the mails might serve its turn for the warship.

VI

EARLY AMERICAN LINERS

We will leave the Navy for a time and continue the story of the foundation of Britain's mercantile supremacy, due mainly to the development of steam.

We have already seen the Cunard Company safely launched on its long and honourable career. Naturally enough its early success prompted others to take the sea. I shall now, very briefly, sketch for you the commencement of several steamship lines which had their inception in the period 1840–1860.

If you remember how prominent the Americans were in the early days of the steamship, how they accomplished the first voyage from New York in which steam was used, and then had the honour

of the first Atlantic crossing with the *Savannah*, which, if not a complete steamship, certainly had that power in reserve, we must have wondered why they had left the initiative to Britain.

I think the reason that they were content for so long to leave the Atlantic to us was mainly that their huge lakes and rivers offered plenty of scope for what was, at that time, a relatively small population. Again, they had very fine fleets of fast sailing vessels afloat which they were reluctant to supplant with the new mode of propulsion.

But in the 'forties the Americans decided that they must have a share of the Atlantic steam traffic, and the Collins Line was established. By some writers it is claimed that our Yankee cousins had decided to sweep the Atlantic. Judging by the fast and splendidly-equipped fleet that the Collins Line introduced, it seemed as if they might have so decided.

The first sailings of the Collins Line

began in April, 1849, from New York for Liverpool by the magnificently-appointed wooden paddle-steamship *Atlantic*, 282 ft. long, 45 ft. broad, 32 ft. deep. This vessel and its sisters *Baltic*, *Pacific* and *Arctic*, had a tonnage of 2,860, side-lever engines, having cylinders 96 ins. in diameter and 9-ft. stroke. There were four large boilers, consuming 85 tons of coal a day, giving a speed of 12½ knots. The paddle-wheels, by the way, attained the huge diameter of 35½ ft.—about the limit these wheels attained.

In the point of speed they easily outdistanced the Cunarders of the 'forties, but the heavy cost of their building, plus that of their running, resulted in them proving unremunerative.

The United States Government gave them heavy subsidies, and it is possible that their initial difficulties would have been surmounted had it not been for two terrible disasters which robbed the Collins Company of two of their fine fleet.

In 1854 the *Arctic* was run down in a dense fog off Cape Race—that fatal point for the early Atlantic steamers—and was lost with 322 lives. A small French steamer called the *Vesta* was the cause of the disaster, which created a profound sensation, for the loss of life was far heavier in proportion to anything of the period, save the *Birkenhead*. The *Titanic* disaster and those of the Great War, have accustomed present-day people to accept as nothing remarkable losses running into four figures where our grandfathers thought 50 was enormous. The world was smaller then and things moved in a narrower channel.

The loss of the *Arctic* was a terrible blow, but worse was to follow. Scarcely two years had gone by when the *Pacific* having sailed from Liverpool on a June day in 1856, was never more seen or heard of. What was her fate? As there was no record of a terrible storm then, I think we can only conclude that an iceberg

was in her way and she ripped herself open and sank like a stone, probably before a boat could be launched.

The highly-efficient watertight bulkheads which give the modern vessel a sporting chance of keeping afloat whilst at least her boats are got out, if not until aid comes along from a sister ship, had not then been introduced. The Collins Line were badly hit with two of their four crack boats gone within ten years of its inception.

The *Arctic* was replaced by a magnificent vessel, built on similar lines, but of much greater size, having 2,500 horse-power. Another ship was laid down to replace the lost *Pacific*, but it was too late, passengers preferred to patronise the slower, but safer, Cunard boats, and in 1858 the Collins Line withdrew completely from the Atlantic.

The last vessel added to its fleet—the *Adriatic*—was laid up until 1861, when she was employed on a new service,

which also had a short life. It deserved better, for it was planned to link the western coast of Ireland, at Galway, with the States. Then the *Adriatic* was laid up again, finally to drift out to the West Coast of Africa to serve as a hulk.

In his fine work entitled " The Atlantic ' Ferry ' ," Mr. Maginnis mentions the fate of many old ships which used to plough the Atlantic. He records that the hulk of the *Adriatic* was actually in use at a West African port at the time his book was written. This was in 1892, so that there is still a possibility that the last of the Collins Line is in existence to-day.

The other two vessels of the Collins Line were converted to sailing vessels, and for some years continued their career more or less successfully.

So ended the first and greatest attempt of the Americans to obtain a share of the steamship traffic of the " Herring Pond ".

The ships ended in " ic " you will notice. We shall see later on how an

English company took this affix for the names of their fleet, and we shall also notice—that following sea tradition, they abstained from using the names of the two vessels that met such an unfortunate fate.

VII

THE LAST OF THE PADDLE LINERS

In the progress made in the thirty years 1861–1890, which we are now to consider, we shall find it best to keep to the mercantile ship for the first part of our story, coming to the remarkable progress made by the fighting ship later on.

At the onset I am claiming a writer's privilege to drop back for a moment into the period with which we have just dealt, in order to tell you something of two vessels which are shown under dates 1856 and 1858 of our " family tree ". Though both were built before the 'sixties, they had a great influence on the future trend of affairs in the shipping world, particularly in the opening years of

what I want to call the midway, or youth, period of the still growing steamer.

Let us take the *Persia* (1856) first. This fine vessel was the first Cunarder to be built of iron. She was 380 ft. long, with a beam of 45 ft. and depth of 31 ft. The *Persia* was built and engined by the well-known Glasgow firm of Robert Napier and Sons. The usual side-lever type of engines were fitted, driven by two cylinders having a diameter of 100 ins. each, the stroke being 12 ft. These engines developed what was then thought the tremendous horse-power of 4,000. Steam was supplied from eight boilers, which had forty furnaces. The steam pressure had risen to 20 lbs., per sq. in., coal consumption to 160 tons a day, whilst the huge paddle-wheels were 40 ft. across, and the speed rose to 13½ knots.

On our "family tree" under date 1862 we have an entry *Scotia*. The latter was a similar vessel to the *Persia*, and goes

down to history as being the last paddle-wheel Atlantic liner.

From the date quoted onwards the screw propeller reigned supreme for the big ship and also for the very small one. But even now for coasting passenger steamers up to, say, 1,000 tons, paddle-wheels are preferred. The *Scotia* was re-built as a screw-propelled vessel after being sold out of the Cunard service, and was then used for cable laying.

Although other lines had adopted the screw propeller, the Cunard were rather inclined to await their experiments, and go on with the paddle-wheeler until it was clearly proved that the screw was superior. Once it was proved, the Cunard allowed no false sentiment to weigh, but sold their paddle-wheelers, and laid down some of the best screw-driven ships of that era.

The passing of the paddle-wheeler from the chief position in steam-propelled craft marks a very definite point in our history, and before we leave paddle-wheels to the

quite small vessel, let us glance at the remarkable ship of Brunel's which boasted both paddle-wheels and screws.

We might have guessed that that great engineer would do something remarkable when he set out to build what was for more than forty years the biggest vessel sent down launching ways. I refer to the *Great Eastern*, which was launched, after a rather serious mishap, in 1858. Here are brief details of Brunel's great masterpiece, which was unfortunate enough to have been born many years before either engines or cargo space were sufficiently developed.

The *Great Eastern* had a length of 680 ft., beam of 83 ft., and an average draught of 25 ft. Although this huge vessel—huge for those days—had a tonnage of 18,915, she was very much underengined. If one looked at her five funnels, and reads that she had 112 furnaces, engines driving paddle-wheels of 2,000 horse-power, plus engines of 4,700 horse-

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R.M.S. "Arundel Castle"
Union-Castle Line.

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"Duchess of Bedford"
Canadian Pacific Line.

power to drive the screw propeller, it hardly seemed possible that such a statement regarding her deficiency could be true.

But when we learn that the *Oceanic* of 1899, the first vessel to surpass the *Great Eastern* had 28,000 horse-power engines without being in any way a racer, we can see where Brunel failed. And we must also remember that the steam engine of Brunel's day was not the magnificent fellow of to-day. It was mainly because the engines were not sufficient to drive the huge hull economically that the *Great Eastern* never became anything except a " White elephant ". Again, people did not travel as they do nowadays; thus, there were never enough passengers to use the palatial saloons and staterooms.

It is said that the *Great Eastern* was designed originally for voyaging between between England and Australia, it being held that her huge size would not only make for safety, but allow enough coal to

be taken for the double trip, besides carrying whatever cargo was available.

As a trial of what she could do and earn, she was first despatched across the Atlantic, taking eleven days on her voyage across. The result was disappointing to her owners, as she did not earn her running expenses, and it was abundantly clear that if she could not do so on the American services, she would never do so on the longer and more difficult route to Australia.

I have always felt particularly sorry for the *Great Eastern* and her designer. Brunel was right in all essentials, both in this big vessel and also in what is often termed his other great failure—the broad-gauge railway. There are many railwaymen to-day who deplore the passing of the broad gauge, because of its capabilities for vastly increased traffic, and again to-day we see the *Great Eastern* exceeded three times over. She was a giantess arriving before the world was ready for

her, and surely her fate points a warning finger to other designers who would leap before they can run.

The rest of her story is soon told. After costing a tremendous sum in her building stage, she proved very costly in launching and then working. There came a great opportunity for service, and after some alterations which took away a funnel and some boilers, she was employed in laying the first Atlantic cable—a job for which her great size was thought to specially fit her, though quite small vessels are now used for the purpose.

Then came what seemed her end in being sold for a coal hulk at Gibraltar. For some reason, she was put up for sale again in London in 1884, when she was knocked down for £26,000. Then she became a show ship and went round the coast from port to port as "the largest ship ever built." It is said she was considered such a nuisance by select seaside resorts that Parliament was asked to

intervene and prevent her calls. Next we find the *Great Eastern* used as a vast marine hoarding, her sides covered with posters. What a life for the biggest ship of her time!

Though we to-day would have been interested to have seen her, especially if she could have been usefully employed, I think we may be really glad that her existence as a hoarding was terminated by her being sold to the ship-breakers, who, it is said, actually made, in 1890, double what she had been sold for in 1884. But it was as scrap, and not as a steamship which had startled the world in its coming.

Yet nine years later she was exceeded in size, and Brunel's dream of monster vessels has indeed come true.

Had Brunel's masterpiece been built ten years later, I venture to think her career would have been entirely different; the day of the big ship would have come twenty years before it did, and the whole

history of steam navigation would have been written on different lines.

You will remember that the *Great Eastern* was fitted with paddle-wheels and screw propeller, and also that her engine power, though vast, was insufficient. In the early 'sixties two things came about which materially affected the future of the steamship; the first, the undoubted superiority of the screw was established; secondly, a vast improvement in marine engines was effected, principally by the adoption of compound working.

The old method of steaming was wasteful in the extreme, especially before the introduction of surface condensation. A word on the latter system may not be out of place. Originally sea-water was used for the boilers, often with disastrous results, and in every case with the great inconvenience of what was called "blowing-off" to get rid of the salts always found in sea-water. The blowing-off was to prevent the deposit of these salts which would

clog the boilers. Before surface condensation was brought about the sea-water used for condensing it, and eventually the condensed water, which was, of course, distilled water, was mixed with that from the sea, and pumped back into the boilers. In surface condensation currents of cold sea-water are forced through numerous small pipes, and the steam is brought into contact with the exterior of these pipes.

The sea-water having done its office is returned to the ocean again. Those of you who have been puzzled by the gallons of water which seem to be issuing to waste from pipes at the sides of a steamer, will realise now that these pipes are the outlets of the condenser. The distilled water obtained in the process of condensation is pumped back to the boilers, and so, in effect, is used over and over again. Here we find a great economy, but there was a greater on the way. This was the introduction of compound engines.

I need not here go over familiar ground

in describing in detail what compounding is, beyond saying that the essence of the compound system is to use steam as expansively as possible.

Still another very important factor may be mentioned that greatly affected the growing power of the steamship—the introduction of a much higher steam pressure. If we remember that boilers were worked at as low a pressure as 6 lbs. in the earliest marine engines, we shall appreciate the extra power and efficiency which was obtained when a pressure of 160 lbs., and even greater, was regularly used.

What this really means is that when the steam came to be used a second or third time in compound working, there was not only a vast increase in power, but a very substantial saving on the coal bill, as much as 25 per cent being saved in many cases where the same ship was converted from simple to compound working.

So far as I am able to trace, the first compound engines were fitted to two paddle

steamers, the *Inca* and the *Valparaiso*, of the Pacific Navigation Company. Mr. Fraser Macdonald, in "Our Ocean Railways," gives the following particulars of the engines of these pioneer craft.

He says: "They had four cylinders—two high-pressure of 50 ins., and two low-pressure, 90 ins. in diameter—steam-jacketed top and bottom only. The pressure of steam used was 25 lbs. above the atmosphere. The condenser was of the old jet description . . . the engines of these two steamers only developed something less than 90 horse-power, the speed of their pistons being from 230 to 250 ft. per minute."

It will be seen that a great deal was not accomplished in these pioneer vessels, which were admittedly low-powered, but the foundation was well and truly laid, and the big, fast steamship of the 'nineties made possible.

One of the next developments, though not an immediate one, was the introduc-

tion of the tandem compound engine. Here, as its name implies, the three cylinders of the triple expansion engine were placed tandem fashion. Mr. Macdonald describes it as a perfect unit, not only simple, but it provides perfectly for the complete expansion of steam, and it can be repeated according to the number of cranks.

Still another factor which helped forward the steamship in the era we are considering was the greatly improved boilers employed. The improvement in the boiler was largely brought about by the use of mild steel. In this way not only was a stronger boiler obtained, but the thickness of the plates was very much decreased.

One more point we will notice before we pass on to the history of the steamer itself, and that is the introduction of forced draught for the stokeholds. I need not stay to describe the various systems brought into use; the general principle involved was that air was forced into the

furnaces by various methods in order to get more intensive combustion.

The engines of the *Scotia* call for an especial word, representing as they did, not the last phase of the paddle-wheeler—the end is not yet—but the last phase on the Atlantic.

The engines were of the usual side-lever type with two cylinders, each having a diameter of 100 ins., with a 12-ft. stroke. A horse-power of 4,000 was indicated, which marks a great advance upon the *Britannia* of rather more than twenty years before. On the other hand there was the increased speed demanded, and, more particularly, the greater tonnage to consider, the latter more than three times of the pioneer steamer of the Cunard fleet. The paddle-wheels were huge indeed, measuring 40 ft. across. The boilers were eight in number, fed by 40 furnaces, which required 160 tons a day to drive the ship at her scheduled speed of 13½ knots. The steam pressure was still very low—20 lbs.

VIII

STEAM IN THE NAVY

THE Americans seem to have first realised that there were great possibilities opened up by applying steam to warships, and thus vastly increasing their utility. Obviously a warship must be able to be on a given spot at a given time. The late war showed that, if it showed nothing else. The only occasions upon which the German Navy made any sort of show were when, employing their fastest vessels, they were able to pounce upon the British coast, inflict some damage, and be off before our ships could catch them.

Fulton, of whose *Clermont* we have already spoken, seems to have been first in the field with a steam warship.

It was only a pigmy, it is true, and was, I imagine, intended to show what an advantage steam would give to a river patrol boat.

Fulton called her the *Demologos*. She was built in 1814, and we learn that she had a double hull, between which a single paddle-wheel acted as the propelling force. The *Demologos* was 156 ft. long, so that she was quite a small affair. She does not appear to have done any fighting in the thirteen years of her life. Her end was that of many early steamers—she blew up.

For fighting purposes the British Navy does not seem to have possessed a steam-driven vessel for a great many years after this.

The Admiralty were very conservative, and they advanced many reasons against the use of steam. It might be useful for non-fighting units of the fleet, such as despatch vessels, supply ships and tugs, but, said the Admiralty in effect, " Let us stick to the wooden walls and sail power—

these we know how to manage, but with the new-fangled agent we might easily be defeated through not knowing enough about it."

Right up to the time of the Crimean War (1854–1855) the sailing ship remained the main line of England's defence. True, many of the sailing vessels had steam engines aboard, but steam was considered merely an auxiliary.

When a boy I used to visit an old grandfather who lived not very far from the sea, and who, though not a seafaring man himself, had many close connections with the Navy. He had a very fine collection of steel engravings of naval vessels of the 'fifties and 'sixties. Their description was given underneath, and I remember quite well how many of them ran. Thus, " Her Britannic Majesty's Steam Corvette *Cygnet* "; the next would be the " Auxiliary Steam Sloop *Daphne* ". (These were not the actual names of the vessels.)

What puzzled me then and for many years after was " Where was the funnel?" The answer would have been: " Tucked away out of sight for emergency use." I mention this as an illustration of what our grandfathers of the Navy thought of steam—this at a time when the Atlantic, and other seas, had fine liners speeding their way with great regularity to all parts of the globe.

One of the greatest objections to steam in the Navy, prior to the general adoption of the screw propeller, was the fact that paddle-wheels would offer such a fine target for the enemy. You could easily carry spare jury masts and rigging, but where could 28-ft. paddle-wheels be stored? Once a paddle-wheel was fairly hit the steam vessel was done for.

Now for a moment let us go back to the second branch of the " family tree ", and take the date 1839 and the ship *Nimrod*. This, let me explain, was not the first steamship the Navy possessed.

As a matter of fact, from the year 1821, when they purchased the small paddle-steamer named the *Monkey*, to the coming of the *Nimrod*, in 1839, they had built or purchased over sixty steam vessels.

Space does not admit of details of these craft, nor are they of great interest, since, as previously explained, they were all of small size, and, with one or two exceptions, intended for non-combatant duties.

In 1839 the first iron warship was turned out from the yards of Messrs. Laird, of Birkenhead, a very old established firm and still to-day one of our best shipbuilding corporations. I do not know that it is quite fair for me to claim the *Nimrod* as a unit of the British Navy, because she really belonged to the East India Company, but as this company was to all intents and purposes British Agent for India at that time, and was superseded by the Government within a few years of the *Nimrod's* launch, I have claimed her for the Navy.

Another year went by, and in 1840 the Admiralty had an iron paddle-wheeler of their own. This was the *Dover*.

A little later the Admiralty purchased, ready-made, an iron screw-propelled vessel. She was re-named H.M.S. *Dwarf*. Of 164 tons, she showed a speed of about 10 knots—at that time considered very good for a steamer.

Next on the " family tree " we have the *Birkenhead*. She, too, was built of iron, and was a paddle-wheeler. Though built as a frigate, she was turned over to transport duties. Her tonnage was 1,400. Of her loss, off South Africa, with 454 persons drowned, I need not tell, for if any story is likely to find a permanent place in the annals of the sea, it is that of the loss of the *Birkenhead*.

The outbreak of the Crimean War aroused our Admiralty to the need for steam warships, and they acquired two paddle-wheel gunboats built in England for the Prussian Government. They were

named the *Recruit* and the *Weser*. Both vessels were double-ended and they had a coal capacity for 2,000 miles steaming. When fully loaded they drew only seven feet of water, which made them extremely useful for shallow rivers or harbours. They had oscillating engines, making 33 revolutions per minute. The speed was over 11 knots. Steam was supplied from tubular boilers. The paddle-wheels had a diameter of 17 ft., they had a tonnage of 334, beam 26 ft., and a length, on the load water-line, of 178 ft.

The *Recruit* and *Weser* had two masts, giving each a sail area of 415 square yards. From the latter details you will see that sails still played a goodly part in the means of propulsion, despite the advance of steam.

It is strange to find that the screw propeller for steam-driven vessels owed much to a farmer named Francis Pettitt Smith. He patented the idea, which he had experimented with in model form, and was joined in his patent by John Ericsson.

After the model, came a launch tried on the Thames. As first made, the propeller resembled a screw far more than it does to-day. There were several blades. Whilst the *Francis Smith* was on one of her trials, half the screw was accidentally broken off. Though the people aboard did not know what had happened at the time, they had noticed a sudden acceleration in the speed of the launch. Subsequent examination and experiment determined the fact that one could have too many blades on a propeller or too much blade area. I should, perhaps explain that the first propeller was of wood, hence the breaking. Subsequently metal was used, and to-day manganese-bronze is about the best material that can be used for this important component of the steamship.

We soon find several vessels of rather small tonnage being fitted with the screw, and the Admiralty's attention was called to this method of avoiding the objectionable paddle-wheels for warships. Again

the Admiralty were hard to convince. Although the Admiralty barge was towed to Blackwall and back with their Lordships aboard at an average speed of 10 knots, they were not convinced, at least not until further demonstrations had been given.

Then a sloop was converted to a screw-propelled craft, and became known as the *Rattler*. Now followed an interesting and convincing test of the merits of the rival methods of propulsion. On a calm day a paddle sloop, named the *Alecto*, was made fast stern to stern with the *Rattler*, and at a given signal both ships steamed their hardest. The result was not long in doubt, and the advocates of the paddle-wheeler saw their champion drawn away at nearly three miles an hour. As both vessels were as similar in dimensions and engine power as possible, the test was a very fair one.

Still another test of the merits of the two means of propulsion was made in

1849, when the paddle sloop *Basilisk* tried conclusions with the screw corvette *Niger* when again the screw demonstrated its superiority.

On our " family tree " we find an entry *Agamemnon*, 1852. The coming of the *Agamemnon* marked a definite advance for the Navy. Here we find big warships designed expressly for the screw propeller, though hull and sails still reminded one of Nelson's *Victory*.

Meanwhile with the advance of steam in the Navy, ordnance had also made rapid strides. During the Crimean War two factors were brought very forcibly under the eyes of naval architects. First, that explosive shells had made the wooden, high-sided man-of-war a back number; secondly, that a ship must be able to manœuvre without dependence on sails for doing it.

Already the paddle-wheel had proved a draw-back because of its size. Now came the screw to redress the balance. It then

became quite clear that the warship of the future must be steam-driven, with a screw out of range of gun-shot, and that she must have a smaller free-board, and also that the latter should be armoured. So the day had dawned for the iron warship with its hidden screw, but not for some years were sails dispensed with.

To France must go the honour of producing the first armoured warship. A wooden frigate, named *La Gloire*, was taken in hand and its most vulnerable parts cased in with iron armour—not *steel* as yet.

When the British Admiralty heard that they were no longer in the van, they awoke rather suddenly and at once converted their yawn into an exclamation of surprise. Then action followed.

Thus, in 1859—*vide* our "tree"—we got the first British ironclad, the *Warrior*. Her coming created as great a stir as did the *Dreadnought* of nearly thirty years

ago. With such a ship our Admiralty told us we might sleep in our beds again.

Let us see what this *Warrior* was like. First, we marvel at the thickness of her armour of 4½ ins., but when we read that this was backed by a wooden sheathing, 18 ins. thick, we are left gasping. The *Warrior* had a good speed, despite her weight, attaining 14 knots. She had two funnels, completely dwarfed by her masts and rigging. She was, in fact, a full-rigged ship as well as a steam-propelled craft.

The year she was launched saw the last wooden line of battleship take the water too. This was the *Victoria*—a name which, as we shall see later on, will always be associated with one of the greatest peace-time disasters in our history.

The *Victoria* of 1859 had three decks, carrying 121 guns. Within eight years of her launch she was off the active list, for though she was screw-propelled, with the good speed of 12 knots, it was realised

that her towering wooden sides would present a splendid target for such ships as the *La Gloire* and the *Warrior*.

The next step taken by the Admiralty was to cut down many of the existing wooden ships and fit armour to their sides.

Whilst this was going on, wooden warships, built in the 'thirties as sailing vessels were still thought well worth while fitting with engines and screw propellers. They could never have been really effective units in case of war, for their hulls were not designed for speed, and the mixture of steam and a plentiful spread of canvas never was, nor ever could be, really effective. The wonder is that the change was ever attempted, but we must remember that then a tight hand was kept on the money chest. And after all, was not the British Navy in an unassailable position after Trafalgar?

IX

THE WARSHIP UNDER STEAM

A COMPLETER change from the naval vessel of the early 'sixties to that of the late 'eighties is almost impossible to imagine.

On the second branch of our " family tree ", we find an entry *Merrimac* and *Monitor*, 1862. These were vessels which became famous owing to a great fight which they made against each other in the American Civil War. This terrible war took place in the early 'sixties because the Southern States wished to secede from the Northern, mainly on the question of the keeping of slaves in the former States.

Whilst most of the fighting took place on land, we may say that the first real

warfare between steam-driven vessels was fought between the North and South. The former States were called the "Federals", and the Southern the "Confederates". The Federals had a wooden frigate, called the *Merrimac*, which was in danger of falling into the hands of the Confederates. To avoid this she was set on fire and burned almost to the water-edge.

In this condition she came into the Confederates' hands, and their naval authorities, having heard of the British *Warrior* and the French *La Gloire* decided to emulate those craft with the *Merrimac*, so they cut her down still further to the water-line, and erected upon her, beginning two feet down and coming four feet above the water-line, what was really an armoured fort. The wooden backing was made exceptionally strong, of pitch pine and oak, and then this was coated with two thicknesses of plating, mainly manufactured from railway metals torn up from

the tracks. Apertures were made for her guns, and with the fitting of a steam engine and propeller she was ready for action.

Not long did the queer craft have to wait for a trial of her qualities. Up came two sailing frigates, the *Cumberland* and *Congress*. Without hesitation, the *Merrimac* went for the *Cumberland* and rammed her, sending her like a stone to the bottom without suffering herself. Then she poured such a hot fire into the *Congress* that she had to haul down her flag, finding that whatever she could do to the *Merrimac* in the way of fire was quite ineffective.

The Confederates were naturally jubilant, and it did seem for the moment as if they might retrieve on sea their defeats on land. But the Federals, too, had thought out the problem of an armoured ship. Captain Ericsson—a name familiar to all students of railway and steamship history—had designed the *Monitor*, and,

by a curious chance, she was enabled to meet the *Merrimac* the very day after the latter had so signally announced her prowess. The *Monitor* was quite a unique craft, and deserves a special description, for she changed the whole trend of naval architecture.

Her deck was 173 ft. long, with an extreme beam of 41½ ft. Her tonnage is given as 614, and she drew 10 ft. of water. Like the *Merrimac*, she has had a substantial backing of wood, on to which 4½ ins. of iron armour was screwed, making in all a thickness of more than 2 ft. Her low decks were awash in a fairly rough sea, her freeboard being only a couple of feet. Both the deck and her sides were heavily armoured, the latter being carried well down below the water-line. But the great feature of the *Monitor* was the adoption of the turret principle.

Here was a small round fort—there is no other word which so accurately describes the erection—and this fort revolved.

In it were placed two very large guns, large that is, for the period. These were placed side by side, and, for the first time in history, the guns of a vessel were able to fire from all quarters.

We shall see as we go along that the principle involved in this great departure from current practice was copied, in various ways, into all future warships. And if you will cast your minds back for a moment to our great naval efforts in the late war you will recollect at once the important part the few monitors, named after rivers, played in its latter stages. Not only in type, but in most other details, these last monitors followed closely the pioneer Federal warship, which was to make such a name for itself in actual fighting.

The *Merrimac* accepted with alacrity the challenge of the curious-looking craft, but she had a rude shock. First there seemed nothing to fire at, save the turret and the pilot-house, and both these

objects made but poor targets. Meanwhile the two big guns followed every movement of the Confederate craft, plunging their shells home with such purpose that the commander of the *Merrimac* had either to make his way home or perish. On the principle that it is better "to run away to fight another day," he chose the former course.

The news of this historic fight reached England and gave our Admiralty something of a shock. All their pre-conceived notions of fighting were made obsolete, and just as the Americans had given us a lead in the building of fast sailing frigates, so did they now with the turret ship.

The Admiralty decided to experiment on an old vessel first, so they cut down the wooden line-of-battleship, the *Royal Sovereign*, a vessel resembling the *Victory*, in many respects, plated her in armour, and added four turrets. In each of these turrets two 9-ton guns were fitted.

Unlike the *Monitor* the *Royal Sovereign* was given 6 ft. of freeboard. In the same year that the *Royal Sovereign* took the seas as a turret ship, the Admiralty built a coast defence ship named the *Prince Albert* on the turret principle. She was of iron construction, 240 ft. long, beam 48 ft., with a rather deep draught which was rather less pronounced forward than aft. Her displacement was 3,687 tons.

The next entry on our "family tree" is the ill-fated *Captain*, 1870. She and the *Monarch* were built on the turret principle, and they were intended to test various innovations. In some respects sister ships, there was a big difference in their freeboard, the *Captain* having the 6 ft. of the *Royal Sovereign*, whilst the *Monarch* had more than double that amount.

Within a year of their building they were cruising together under sail in the English Channel, when they encountered

a sudden squall, which caused no inconvenience to the *Monarch*, but sent her sister right over. She could not right herself, and went down with practically all hands. The Court which investigated her loss found that it was not due to the weight of her armour, nor yet of her four 25-ton guns, but rather due to defects in design.

There was widespread consternation caused at the time by the loss of this fine 8,000-ton warship, whose speed was remarkable for her day, coming to within a fraction of 15 knots. In a Midland church recently I saw her flags, placed there owing to the association of her captain with that building.

Then, in 1872, we find the turret idea still further developed in three vessels which bore well-known Navy names—*Thunderer*, *Devastation*, and *Dreadnought*. In these ships twin-screws were introduced, which had a great effect in improving their handling.

In a heavy sea they were extremely "wet bobs", owing to their low freeboard. For many years, however, they were considered some of the best vessels in our fleet. With the introduction of these three ships we see sails disappearing from our warships. Instead of canvas, the masts were provided with fighting-tops, equipped with quick-firing small guns. With a tonnage of close on 10,000 the huge battleships of to-day were foreshadowed very clearly. The strength of the armour and its backing varied from 12 to 14 ins., the turret being more strongly protected than the rest of the vessel.

The big guns varied in weight from 33 to 38 tons, and were, like the rest of the period, muzzle-loaders. These guns were really powerful, though perhaps not in comparison with present-day weapons. We learn that at 2,000 yards a shell weighing 809 lbs. could penetrate armour and backing 16 ins. thick.

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"ALBION"
T.S.S. Turbine Yacht.

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"NELSON"

Annual upkeep of this type is officially stated at £380,020, with indirect personnel charges added £432,960. Cost of guns and turret armour is approximately £3,000,000. Cost of engines, approximately £490,000.

We jump nine years to look at the next date on our "family tree", this being the *Inflexible*, 1881. This was a modification of the turret principle, the latter having given place to what was called the "citadel". Here we have the armour-plating concentrated on a section of the ship, varying from a third to about half the ship's length, and here, of course, the guns were concentrated.

The "citadel" was also designed to afford protection for the engine-room, on which the safety of the ship depended to a very great extent. Thus it was possible for the enemy to rake fore and aft, and do a great deal of damage, but the vital parts were furnished with armour plates 2 ft. thick. The twin-screws were maintained, and we note that the tonnage displaced was now 11,880. The *Inflexible* was 320 ft. long, and had a speed of rather more than 13 knots, not so fast, you will observe, as some of her earlier sisters.

Our next date is 1888, when we find another ill-fated ship put in service. This was the *Victoria*. Here was still another change in design. The barbette had come along. Resembling very much the turret, the barbette had this difference, that, whereas the turret revolved with its guns, the barbette was fixed with its guns running round on what we might term a turntable.

Two huge guns were fitted in the *Victoria* and her sisters. These weighed 101 tons each, and were the last monsters to be made of that description. From their position in the barbette they could rake an opponent, whatever his position.

I should mention here that the *Victoria* followed the *Admiral* class in being steel-built.

These battleships were supposed to be extraordinarily safe ships, having no less than twenty watertight compartments, a double bottom, and the whole of the hold was covered by a platform, which should

also provide a watertight arrangement for the engines, boilers and magazines.

Other additions were torpedo tubes and a ram—the possibilities of the latter were only guessed at when the *Victoria* was built; later it was to be shown what a fearsome weapon this was to prove. The guns were now breech-loading.

The armour-plating was now also of an improved type. At first plating had been made from wrought-iron, which proved quite strong enough when the shells used against it were of cast-iron. When, however, the missiles used were manufactured from steel, the latter metal had to be employed to resist the shells. After a trial of mild steel for armour, something better was found by welding the steel armour on to an inner coating of wrought-iron.

Guns, too, had been growing in size and strength. No longer could a warship stand up to a broadside like Nelson's "hearts of oak" did. Fortunately, the

British Navy was not called upon to fire many shots in anger during this transitional period, but there was nothing to prevent armour-plating being set up for trial by the new weapons. What a mess the new guns made of some of the armour proposed for new ships! In many cases the whole of the ship had to be re-designed on account of the armour-plating proving too slight.

Then guns were made to fire much more effectively both as regards frequency and accuracy. So that all this meant far more rapid changes in the form of the warship than was the case in her sister of the mercantile marine, though here, too, change was rapid.

A great many preconceived ideas about the safety of the big ship were shattered when the *Camperdown* rammed and sunk the *Victoria* whilst at manœuvres on a peaceful June day in 1893. On the calm Mediterranean, within sight of land, the then finest ship of the British Navy was

sunk with the loss of 339 officers and men. All this despite the numerous watertight compartments and the perfect discipline which reigned aboard.

Until the *Titanic* disaster, nineteen years later, I cannot remember a loss which so stirred our countrymen. In each case it was the finest ship of the kind involved, and in each case an error in judgment resulted in the total loss of the ships, and a great part of their complement.

The loss of the *Victoria* showed how extremely vulnerable was the modern ship, and that however numerous were the watertight compartments, if the hole in the hull was sufficiently large, the flooding of a few compartments would probably cause the ship to turn turtle.

The ram as a weapon of offence was seen to be also of doubtful value, since the *Camperdown* could but just limp to the nearest port, and was in imminent danger of following her ill-fated consort.

One other development, at the opposite end of the scale in warship construction, requires to be mentioned now. This was the coming of that sea shark, the torpedo-boat. These belong to the latter part of the thirty years we are considering. By many their coming was heralded as marking the last phase of the big warship, since these mites could steal up, deliver their torpedo, and be off again before the giant was aware of their vicinity, assuming the attack to be made at night. We shall see later on how the torpedo-boat met its match.

We have now brought both branches of the steamship up to 1890, and now we will go ahead to complete its story from 1890 to the present time.

X

THE MODERN WARSHIP

Look once more at our " family tree ". Here we find *Majestic*, 1893. Be careful not to confuse the *Majestic* of the Navy with the two ships of same name in the White Star mercantile service. The *Majestic* with her sister ship the *Magnificent*, brought us still farther along the path of the huge fighting machine of the present day.

The tonnage of these two fine boats was 14,900, and they cost almost a million each. Instead of concentrating on a couple of huge 110-ton guns, which were worthless after firing a hundred rounds or so, we find four 12-inch, twelve 6-inch, and quite a large battery of smaller quick-firing guns installed. The largest of the

quick-firers, at this period, was a 6-inch, throwing a 100-lb. shell.

The introduction of nickel-steel allowed much more of the hull to be plated, for though very much stronger than the usual armour of that period, it was from 3 to 5 ins. less in thickness. The *Majestic* was one of the battleships that went down whilst engaged in the Dardanelles campaign.

The 'nineties also saw great attention given to the fast cruiser, both of the armoured and the unarmoured classes. Perhaps the best known of the day were the *Powerful* and *Terrible* which, whilst having the tonnage of a battleship, had also the speed of the fastest liners of that period. This was 22 knots.

These two fine boats were built for long service abroad, and, in the event of war, they would have preyed on foreign shipping what time they were not convoying our own. Their hulls were treated in a rather remarkable fashion. On the steel

plating of the hull a wooden sheathing was imposed, which, in turn, was covered in copper.

The *Powerful* will always be remembered in connection with the South African War. Her guns were lifted off her and sent up to fire upon the Boers, and they rendered the greatest service possible. The last heard of this famous ship was that she was now allotted to the *Impregnable* at Devonport to be a unit in the training of our young sea dogs of the Navy.

Going back for a moment to the battleships we find the " Canopus " class succeeding the " Majestics " at the head of our battleship roll.

The *Canopus* had a very lucky escape when the *Good Hope* and *Monmouth* were sunk off Coronel. There were some critics who claimed that had she been with those ill-fated ships she would have turned the tide against the big, fast German cruisers; others knew, or professed to know, that

the *Canopus* would have joined those unfortunate craft in their journey to the bottom, because the speed and guns of the German cruisers outranged that of what was considered an obsolete class.

I mention this detail to point the moral of how quickly the battleship was growing up, and how dangerous she may be to her people if allowed to be overtaken by middle age.

Following the " Canopus " class we get in quick succession the " Formidables ", the " Duncans ", and the " King Edwards ". Each class is called after the pioneer vessel of the series, and each marked improvements, which we have not time to consider in detail.

Then came what naval men considered the last word in battleships—this was the *Dreadnought*, which, put into service in 1907, made every other battleship afloat obsolete for all practical purposes. In this fine vessel the speed went up to 21 knots, mainly because the Admiralty recognised

the value of the steam turbine. The *Dreadnought* had a displacement of 17,900 tons, and most of her guns were of the 12-in. variety. The use of a number of those guns made firing practice extremely costly, as each discharge worked out at about £100. Very expensive armour had to be employed. This was of Krupp steel, 11 ins. thick, which, under test, proved to have greater resisting qualities than 20 ins. of the armour-plating described a little time since.

It may be truly said that the *Dreadnought* set the pattern for the world, and at once other nations began to take part in the race for big, powerful, high-speed battleships.

Directly they produced something approximating the *Dreadnought*, we, as the premier Navy, had to go one better, so in 1909 what were called the super-Dreadnoughts began to appear. In two short years, the *Dreadnought*, about which pages upon pages were written, was a

back number! The "Bellerophon" class thus succeeded the "Dreadnought," and even now the race was not ended, nor will it ever be until universal peace wipes out the warship completely.

In 1910 we had the "St. Vincent" class, with an increased tonnage (19,250), but with the same speed as the "Dreadnought." More guns were carried. Then came the "Neptunes" of 20,000 tons, followed very quickly by the "Orions" and the superb "Queen Elizabeths", which were the last type to share the honours of the Great War. These had a fine speed with 15-in. guns, and are considered to be the best all round class of battleship so far built. Then came the *Nelson* and *Rodney*, with a tonnage of 35,000 and 16-in. guns.

That brings us to the end of battleship construction, but we must now have a word about the entirely new type of ship which has been evolved within the last few years, and which played a conspicuous

part in the late war, indeed, no ship had the limelight so much as this class.

Perhaps we should do better to trace them upwards from the cruiser rather than from a side issue of the big battleship. From the swift and well-armed *Powerful* and *Terrible* of the 'nineties, came the " Cressys " at the opening of the present century boasting a tonnage of 12,000, allied with a speed of 21½ knots. They cost three-quarters of a million each to build, and were looked upon as extremely useful craft, their speed allowing of their getting away from a battleship, whilst they were ideal for convoying duty.

We all remember the shock we had in the early days of the War when the *Cressy* herself, and two of her class, were sent to the bottom in one day by a German submarine. Then came a slight reversion in the " County " class, which, whilst considerably smaller, had some advantage in the matter of speed. The 9.2-in. guns of the " Cressys " were supplanted by a

battery of 6-in. guns. The early "Counties" gave way to the newer " County " type, of which the ill-fated *Hampshire* was a good example. These came out in 1903, and paved the way for the coming of the battle-cruiser in 1907. The two first vessels of the latter type were the *Indomitable* and the *Invincible*.

The writer remembers seeing the former leaving Portsmouth with the present King aboard on a trip to Canada. On the voyage back the vessel was opened all out for a speed test, the King himself taking a hand with a coal shovel, and she attained the remarkable speed of 29 knots, thus eclipsing the best speed record of the fastest mercantile ships afloat. When we consider the immense weight propelled through the water, the heavy plating and guns, I think we can realise how far our designers had come along. This class was much more powerful, quite apart from its speed, than any pre-Dreadnought class.

The " Indomitable " class was added to, and we got, in later years, the famous *Lion*, *Tiger*, *Queen Mary*, and *Princess Royal*, which played their valiant part in that epic struggle off the Jutland coast, when several of them paid with their lives and the lives of many gallant British tars.

Since the War the magnificent *Hood* and *Repulse* have been completed, having a very powerful armament and a speed of 31 knots.

So much for the battle-cruiser. Then the cruiser herself went on developing on the lines of the " County " class, though, generally speaking the tendency was to produce smaller and faster boats than hitherto. To-day the latest " County " class of 10,000 tonners represent the last word in cruisers.

We mentioned the torpedo-boat some time back. As an effective war unit this little fellow had a short life. Hardly had the number grown to respectable proportions when the torpedo-boat destroyer was

brought out. Here was an enlarged torpedo-boat with superior speed, armed with quick-firing guns, and also torpedo tubes. Speed quickly mounted in this class, and each succeeding type brought something remarkable in the matter of speed, if not in armament.

Both France and Germany pinned their faith to the torpedo-boat in the 'nineties, doubtless thinking that whilst they could not compete with us in capital ships, there was no reason why they should not have a larger number of these mosquito craft. It was thought by both these Powers that, with a preponderance of torpedo-boats, the odds against them would be greatly lessened in case of war.

If we remember that in the 'nineties the Germans were busy with their new Navy, and the French fleet was then second to ours, and quite as likely to fight Britain as side by side, we shall see the line of argument quite clearly. But, as in most engines of warfare, an antidote was looked

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"MAJESTIC"
White Star Line.

Face page 129]

EXPRESS LINER "EUROPA," THE HOLDER OF THE BLUE RIBAND

for, and never was such a complete one found as in the torpedo-boat destroyer, which we now call by the simpler name destroyer.

From a purely steamship point of view the destroyer is easily the most interesting naval unit, since the battleship and cruiser depend on their armour and guns to a greater extent than their speed. On the destroyer everything is sacrificed for speed. It has been my good fortune to inspect some of these craft which have been in hospital for various reasons. In two cases the bows were the damaged portion; one from a head-on collision, the other from running at full speed up a shingle bank. The result in both instances was remarkable and illuminating. Between "our jolly jack tars" and the sea there is a thin plating of steel, so thin that it looked at first sight as if it might be cut with a strong pair of scissors.

In reality the plating is much stronger than it looks, but it is naturally susceptible

to damage on the slightest blow. In the two craft of which I am speaking, the bows were crumpled up for all the world like a broken concertina, or, as one sailor put it to me, like a salmon tin on which an elephant had trodden.

Apart from some quick-firers of small dimensions, the destroyer's only means of attack lies in her torpedo-tubes. As many of you know, destroyers were the real handy-men of the war, and in various seas and in various ways they paid a terrible penalty. Not only did they take their share in the larger engagements when really only battleships and similar craft should have been employed, but they kept open our lines of communication, convoyed our food ships and transports, and proved the most relentless antagonist the German submarine had to encounter.

Often the writer watched the brave little craft darting hither and thither in search of the hidden foe, and often has he seen them mothering huge ships across

the Channel, when, but for them, the submarines would have taken a fearful toll of the comparatively few ships with which we were left towards the close of the conflict.

If you will go back to our " family tree " for a moment you will find the remaining entry on our warship branch which has still to be mentioned. This is the *Swift*, date 1909. The *Swift* was a super-destroyer, and when she put up a record of over forty-one miles an hour in her speed trials, it was thought that the limit of ocean travelling had been reached—at any rate for steam-driven craft. Contrasted with the earlier destroyers, with a tonnage of about 200, the *Swift* and her sisters marked an enormous step forward. Apart from speed, their tonnage ranged to within measurable distance of what a cruiser used to be, i.e. 1,000 tons. Of course these greyhounds were oil-fired, and they set the fashion, which is now copied for all new, fast ships, and which has proved

worth while trying on the older coal-fired craft.

Later came whole classes of destroyers and the very big destroyer, known as the flotilla leader—almost a light cruiser.

It would have been interesting to have given you a great deal of detail regarding the wonderful engines of destroyers and other fast craft. When the Admiralty do not absolutely forbid it they are still reticent concerning the design of modern warships. Without any question we can respect the reasons which prompt this reticence, and as we shall be dealing with similar propelling machinery on the fastest liners very shortly, we will not stay for further details of warships. This brings me to the end of our second branch of the " family tree ".

XI

FAMOUS ATLANTIC FLIERS

On the " family tree " there is an entry *Oceanic*, 1870; this marks a most important development not only of the Atlantic Ferry, but also of the steamship. The *Oceanic* was the first liner of the now famous White Star Company, and she was quite ahead of anything then on the Atlantic.

The *Oceanic* not only made the name of the White Star well known to all ocean travellers, but it brought into prominence the now great firm of Harland & Wolff, of Belfast. Already they were fairly well known in shipping circles as builders of reliable vessels, but up to this point they had not entered the market for big liners.

The *Oceanic* had a length of 420 ft., a beam of 41 ft., a tonnage of 4,500, and the horse-power of the engines was 3,000. To run with the *Oceanic* several other ships of similar tonnage were ordered, and they took the names of some of the ill-fated Collins liners, which we have already noted. Always the ships of the White Star have had names ending with the suffix " ic ". Two of the Collins liners met with grave misfortune, and although their names appeared in the first announcement of the White Star sailings as *Pacific* and *Arctic*, they were actually renamed *Republic* and *Celtic* before they came into service.

The compound engine had now made considerable strides, and the White Star were well advised in choosing it for the *Oceanic*. There were two high-pressure cylinders, and two low-pressure, and they were divided into pairs, actually forming for the single-screw two distinct engines.

The *Oceanic* captured the Blue Riband

of the Atlantic straight away, but she held it for only three years, for in 1874 there appeared the *Britannic* and *Germanic*. These were considerably larger vessels, having a length of 455 ft., a beam of 45 ft., and a tonnage of 5,004. The engines were more powerful, primarily because the ships were bigger, but also with a view to an increase in speed.

When these vessels had settled down to work, they brought the passage across the Atlantic to less than seven and a half days.

Whilst the *Oceanic* was in the course of time drafted to the Pacific service with two or three others of the original White Star fleet, the *Britannic* and *Germanic* remained in the express fleet for a great number of years. In fact, it was not until well into the present century that they were disposed of, the *Britannic* going to the ship-breaker, whilst the *Germanic* was sold to a Turkish company, and as recently as 1930 was still afloat. Then it was said she had the misfortune to go ashore, and

although efforts were being made to float her at the time this was written, there was some doubt as to whether the fine old ship would be actually got off the rocks.

Returning again to the " family tree ", there is an entry 1879 which gives the names of two steamships, the *Arizona* and *Buenos Ayrean*. There is not a great deal to record of the latter, except that she was the first liner of any size to be built of steel, and thus mark another step towards the monsters of to-day, for it is the use of steel which has made possible the large hull. The *Arizona*, however, was one of the most famous fliers of the 'eighties, and for a time held the Blue Riband of the Atlantic. She was built for the Guion Line, a name now forgotten, but very well known in those days of intensive rivalry upon what is often called the " herring pond ".

The Guion Line was not happy about the White Star's annexation of the speed

record, and so the *Arizona* might be claimed as their reply to the *Britannic* and *Germanic*. She was built upon the Clyde by John Elder & Co., and had a length of 450 ft., 45 ft. in beam, with a tonnage of 5,164, so that she was only a trifle larger than the corresponding ships of the White Star, although she came five years later. There was a considerable improvement, however, in her compound engines, and her boilers needed 125 tons of coal a day. This seems very small to us when we realise that before such ships as the *Mauretania* went over to oil fuel, 1,000 tons a day were needed. But in the early 'eighties it seemed as if the limit had almost been reached from a fuel point of view.

The name of the *Arizona* will always be remembered because of her remarkable adventure with an iceberg. She was running at practically full speed when she crashed into a berg which the lookout had not seen, or had seen too late. Everyone

aboard felt that the gallant ship must sink, for her bows were stoved in for all the world like a concertina, and the water poured into her hull. But she was an extremely well-built ship, and her bulkheads held up against the inrush of water so that she was able to limp into harbour and be patched up temporarily before going home for rebuilding.

In the past such a misadventure would have doomed a ship, and in all probability the shipowner would have scrapped her, or at the best put her in service again under an entirely different name. In point of fact, the accident to the *Arizona* did her and the Guion Company a tremendous amount of good, because it proved that it was possible for a well-built liner to stand up to the worst that an iceberg could do, *always providing she met it head on*.

A successor to the *Arizona*, the *Alaska*, built in 1882, brought the Atlantic passage down to less than seven days, and it

is said that she was the first liner to be dubbed an " Atlantic Greyhound ".

Heartened by the success of the *Arizona* and the *Alaska*, the Guion Line now built the *Oregon*, this was also a splendid vessel, and promptly annexed the Blue Riband. She came from the Clyde yards of Elder & Co. She had a length of 500 ft., a beam of 54 ft., and the tonnage was 7,375, so that she represented a considerable advance on the *Arizona*. It was, however, the engines of the *Oregon* which were considered the greatest achievement of the marine designer and builder, they were of the usual compound type, but they needed an enormous amount of steam in comparison with what the preceding fliers had used. The coal consumption had now leapt up to 310 tons a day.

Unfortunately the Guion Line could not keep up the pace, and instead of their fast ships making their business a successful one, they found that they were losing money, and with great regret they sold the

splendid *Oregon* to the Cunard Company, who were only too glad to get the fastest ship of that period on very favourable terms. Unfortunately she had not been long under the Cunard flag before she was run down by an American wooden schooner and sunk off New York. She actually kept afloat for some hours, there was no loss of life and the mails were saved.

The Cunard had seen that they were losing prestige, whilst the Guion, National and White Star Lines were putting such fast steamers in service, so our next entry on the " family tree " is a Cunarder, the *Umbria*, 1884. With the *Umbria* came the *Etruria*; these fine ships came from the Fairfield Shipbuilding Company, who were no other than the reconstituted firm of John Elder & Co. These Cunarders were built of steel, and had a length of 500 ft., a beam of 57¼ ft., and a tonnage of close upon 8,000. Their compound engines which were copies of those used

in the *Oregon* ensured them a speed of 19½ knots, the horse-power being 14,500. Such fast ships as these brought back the Blue Riband to the keeping of the Cunard. They ran successfully for a very lengthy period, indeed, they were not entirely displaced until 1909.

The *Umbria* and *Etruria* will go down to history as the last single-screw liners of note, and the need for the twin-screw was clearly shown through breakdowns which both these fine vessels sustained, each having to be towed home on account of a damaged or lost propeller.

A glance at the " family tree " shows the next entry as the *City of Paris*, 1888. Actually she came into service a year later than that date, and with her sister, the *City of New York*, a complete revolution on the Atlantic was achieved. In the first place they were the first big twin-screw liners, and for the first time also a tonnage of five figures was reached, each of them exceeding 10,000 tons. Up went the speed,

and these ships could keep up well over 20 knots. Perhaps this does not look at first sight a very great increase on that of the two Cunarders just dealt with, but in point of fact every half knot attained means a much greater coal bill. In those days coal was cheap, and therefore it was not so important a factor as now, even so, however cheap it may have been, there is no question but that the cost of running a twenty-knotter showed a very substantial increase on that of a slightly slower vessel.

The *Cities*, as they came to be called, were both built in the yards of J. & G Thomson upon the Clyde. They were without doubt the handsomest pair of liners which have ever been seen, for they had beautiful lines, clipper bows, and three raking funnels, together with some towering masts. As soon as the *Cities* got into service they brought down the crossing to less than six days, breaking every record. They had a length of 560 ft., a

beam of 63¼ ft., and a gross tonnage of 10,498. Two sets of triple-expansion engines drove each of the twin screws.

Unfortunately for Britain, the Inman Company followed the Guion and National in falling upon hard times, and within a very short period of these fine liners coming into service, the Inman Company was taken over by the International Mercantile Marine, an American company which was subsequently to take over many other well-known British lines. One of the first results was the transfer of the *Cities* from Liverpool to Southampton, and it may be claimed for them that they were the real precursors of a string of famous Atlantic liners which have made Southampton their home port.

With the transfer of these two fliers to American control went other Inman ships, but they are not of any particular interest. What was, however, very important, was the passing of a special Act of Congress to enable these vessels to sail under the

Stars and Stripes. Under American law a ship must be built in the States to fly the national flag. A condition was made, however, and it was that two similar vessels must be built in American yards; these came out in 1895, and were named the *St. Louis* and the *St. Paul*, each of 11,000 tons, and 20-knot speed. They were handsome two-funnellers, but did not have the clipper bows of the *Cities*. On transfer to the American flag the words " City of " were shorn from the names of all the Inman fleet.

Under the management of the American line, the *Paris*, *New York*, *St. Louis*, and *St. Paul* ran a regular weekly service from Southampton for approximately thirty years, though the services were interrupted by two wars, that of Spain and America, and the Great War. Even in the latter they were able to keep in service until the United States joined the Allies, then in 1923 all four were sold for breaking up, and thus ended a very useful and

varied life. The *Paris* had a remarkable adventure in 1898 when she went aground on the only flat rock of the Manacles group, off the Lizard. Within a few yards of her were peeping up the masts and funnels of the ill-fated *Mohegan*, which only a few months previously had run upon a sharp ledge, ripped open her bottom, and sunk with the greater part of her passengers and crew. The *City of Paris* was firmly fixed for many months, and was finally got off, taken round to Belfast for reconditioning, and when she emerged it was as the *Philadelphia* with only two funnels.

There have been cases in which new liners have failed to come up to the stipulated speed on the measured mile, or again where they have failed to maintain the sea speed which was guaranteed. The most beautiful liner of her day was such a case. This was the *City of Rome* ordered for the Inman Line and intended to be the Blue Riband holder of the Atlantic.

She was the first big ship to have three funnels and with her four masts, well equipped with canvas and her clipper stem she looked every inch a flier. But she could not reach the sea speed contracted for and so she came back to her builders, who for a time were rather concerned as to her future.

Very few steamship companies needed so large a ship, nor were they anxious to possess so fast a vessel, even if she could not beat all rivals. But very fortunately for the builders the Anchor Line was on the lookout for a new boat and the handsome *City of Rome* attracted their attention. Certain alterations were made to fit her for the new service and for about twenty years the rejected of one line was the favourite vessel of another.

She set the fashion for the three-funnelled liner and was the model upon which the more famous *City of Paris* and *City of New York* were built; these were the Blue Riband holders of the 'nineties and both

in speed and comfort were unsurpassed in their heyday.

Another liner with three funnels was also rejected. This was a big German-built ship which could not reach her stipulated speed. For more than a dozen years she lay practically derelict, costing quite a lot of money for what attention was needed, such as repainting and upkeep generally. Then a French company heard of her and sent an expert to look over the rejected liner. He was satisfied, that, re-conditioned, she would be just the ship for a South American service; thus the rejected of the North Atlantic lived to be the fastest liner in the South Atlantic, doing years of good service until she reached the shipbreaker's yard.

A liner which is sold out of service has usually two alternatives before her; either a direct trip to the breaker-up or else, under another name a long spell of service in a humbler capacity.

Some years ago a smart-looking liner turned up on the Canadian service. Many old sea-farers looked at her; some smiled and nodded, others were frankly puzzled. Those who smiled recognised the newcomer as a thirty-year old Blue Riband holder in her heyday. But those who did not know went home to wonder how it was that without any beating of drums the newcomer had promptly annexed the Canadian speed record and kept it for some years until she was sold to the Turks. This was the old *Germanic* of the White Star Line, subsequently the *Ottawa*, and now bearing an unpronounceable Turkish name.

XII

FIGHTS FOR THE BLUE RIBAND

ANOTHER entry on the " family tree " is the *Majestic*, 1889; she was one of a pair of very remarkable ships, the other being the *Teutonic*. These were the White Star reply to the Inman challengers, the *Cities of Paris* and *New York*. In many respects they were similar ships, though outwardly there was a great difference, instead of three funnels, the White Star boats had only two, and these were well spaced, in order to allow of the dome of the saloon coming between them. They were narrower and slightly longer as regards hull, and they had a straight stem instead of the clipper bows.

Although we have said they were the reply to the Inman " Cities " it is necessary

to add that the plans for these splendid 10,000 tonners were actually made by Sir Edward Harland in 1880, but at that time the White Star were unable to go forward with their building. The *Majestic* and *Teutonic* were really less than 10,000 tons, but in the point of speed they were the equals of the larger ships. Just as the *Paris* was slightly faster than the *New York*, the *Teutonic* was always claimed to be the faster of the two White Star vessels, yet it was the *City of Paris* and the *Majestic* which seemed more often to come up against each other in the fight for the speed record.

There is a story still told of how these two splendid liners started on the same day from New York and kept neck and neck right across the ocean until their paths diverged at the beginning of the channel. No better proof of their excellent speed could be put forward than this so-called race.

As usual with vessels built by Harland and Wolff, they were given *carte blanche* to

put in the best work possible, the owners and builders having always worked upon a system which is of mutual benefit.

The White Star people say to Harland and Wolff, "we want a ship with the following speed, tonnage, and accommodation, for such and such a service." Plans are then prepared and if approved, the vessel or vessels are laid down and delivered in due course. A careful inventory is kept of the cost, and to the total sum expended is added an agreed percentage for profit on the work, and thus the shipowner gets a vessel in which everything is of the best, whilst the shipbuilder, knowing that he cannot lose by producing everything of the best, is able to give it.

There was indeed very little to choose between these four ships which were so similar in tonnage and speed, and it is extremely difficult to say to which of the quartet should be given the title of Blue Riband holder. An analysis of their runs rather suggests that of the

four the *City of Paris* was really the fastest.

The *Majestic* was withdrawn from service just before the Great War began in 1914, and was sold to the shipbreakers. They got to work so quickly that the poor old ship was gone beyond recall when the need for every possible vessel became so apparent. It is interesting to find, however, that though she could not serve on the sea, her plating went into shells which helped the man ashore.

The *Teutonic*, on the other hand, went on the service for which both vessels had been subsidised, that is as an armed cruiser, the guns having always been ready for an emergency such as now arose. She served with the tenth cruiser squadron throughout the War, and did very useful work indeed. She was sold by the White Star to the Admiralty in 1915, and after doing service as a troop-ship when the Armistice released her from patrol duties,

she was sold to the Dutch and broken up in 1921.

The next entry on the " family tree " is the *Campania*, 1892. The Cunard were not content to let the Blue Riband be held for any length of time by their rivals, and thus they laid down the *Campania* and *Lucania*, which had a length of 620 ft., a beam of 67¼ ft., and a tonnage of 12,950. Here it will be noticed was a substantial advance within four years of the " Cities " and the two White Star vessels already mentioned coming into service. A speed of 22 knots was demanded, and both vessels were able to exceed it. The two sets of engines for driving the twin screws had each five cylinders.

These two ships quickly showed that they were the fastest mercantile vessels afloat, and they became very great favourites. Outwardly they resembled the White Star fliers rather than the " Cities ", but everyone commented upon the huge size of their two funnels. The *Lucania* was

unfortunately burnt out in dock at Liverpool in 1909, and was thought not worth re-conditioning, but the *Campania* continued upon the New York run until the Spring of 1914. She, like the *Majestic*, went to the scrappers just before the War, but they had not made any headway with her when she was sold to the Government for conversion to a seaplane carrier. Throughout the War the *Campania* was attached to the Grand Fleet, and only missed the Jutland battle by a mere accident. After the Armistice she broke loose in the Forth, and was driven by the current across the bows of a battleship.

Wounded, the gallant liner slowly settled down, remaining long enough afloat for all her people to get away safely. She had to be blown up later because of danger to traffic.

Within five years of these fine Cunarders coming into service, Britain had a rude shock. The Germans had previously come to us for all their liners, but now they were

able to build their own, and so well were they able to build that in 1897 the *Kaiser Wilhelm der Grosse* actually secured the Blue Riband from the Cunarders. She was considerably bigger, and had an increase of speed of about a knot. This four-funnelled liner belonged to the North German Lloyd, but within three years of her coming into service the rival company, the Hamburg-Amerika, brought out the *Deutschland*, which was even faster, and she became the Blue Riband holder.

As may be imagined, the British were not at all comfortable about this loss of supremacy in the Atlantic speed contest, and there were great hopes that either the White Star or the Cunard would get it back again. The Inman, as we have noted, were now definitely out of the race. When it was known that the White Star was building their second *Oceanic*, and that she was to be much bigger than the German flier, hopes ran high, but when she came into service in 1899 it was found that she

was anything but a speedy boat, indeed, her speed was approximately that of the *Majestic* and *Teutonic* with whom she shared the express service. She was, however, the first vessel to exceed Brunel's masterpiece the *Great Eastern* in length. The *Oceanic* had a length of 705½ ft., a beam of 68 ft., and a tonnage of 18,300. Her two sets of triple expansion engines produced 28,000 horse-power, and on trials she ran at 20½ knots. In general design she followed the *Majestic* and *Teutonic* with her well spaced funnels and graceful lines; indeed, the *Oceanic* was often called the ocean yacht, so graceful did she appear.

In point of comfort and luxury she was easily ahead of anything ever seen afloat.

The next entry on the " family tree " is the *Baltic*, 1904. Here was a much bigger ship than the *Oceanic*, also a slower one. The *Baltic* had a tonnage of roughly 24,000, and a length of 708 ft., with a beam of 75 ft. Her speed was only 16½ knots,

the horse-power being 14,000. She was the third of a series of what came to be called nine-day boats, and when the *Adriatic* joined the *Baltic*, *Cedric* and *Celtic*, in 1907, a quartet of very comfortable but rather slow liners was completed. Until the loss of the *Celtic* by stranding in 1929 this quartet remained together on the Liverpool–New York service, where their steadiness and comfort proved very satisfactory, both from the travellers and the company's point of view. Not everyone is in a hurry to get across the Atlantic, and as these big White Star boats had plenty of cargo capacity, they proved very profitable.

The next step in the development of the steamship now came about. This was the invention, by Parsons, of the marine turbine. To demonstrate its possibilities a small ship was built—the *Turbinia* which reached a hitherto unknown speed. She is now—or rather part of her—in the South Kensington Museum.

There is a story told of the *Turbinia* and how she brought herself and her engines to the notice of the Admiralty. A splendid naval pageant was staged at Spithead in the early years of the present century. The *Turbinia*, built on the Tyne, was sent down to Portsmouth and when the lines of warships were in review order the tiny craft stole out and saucily began the patrol of the outer line. Then she turned and began to speed along in forbidden waters —between the two lines of ships. She was signalled to return, but when no notice was taken of the messages a couple of destroyers were sent to chase her. The *Turbinia* so the story goes, almost allowed the fastest craft then afloat to catch her; then suddenly she opened out and left the t.b.ds. far behind—standing, one sailor put it.

The result could be foreseen—the Admiralty did want to know something about the mysterious craft and within a very short time destroyers were in service

which depended upon turbine engines. Then quickly a Clyde pleasure steamer demonstrated that the turbine was essentially the propelling agent for river work. Followed the ocean liner in the shape of the *Carmania* of the Cunard and then came those most famous of ocean greyhounds the *Mauretania* and the *Lusitania*, the fastest liners ever built until 1929, with a speed of 26 knots, a speed thought unattainable thirty years ago.

XIII

FURTHER BLUE RIBAND CONTESTS

THE same year that saw the coming of the *Adriatic*, also gave us the two most famous vessels which have ever flown the red ensign. These were the *Lusitania* and the *Mauretania*. Perhaps you will think this a rather big claim for these fine Cunarders, but if you will remember that " the Blue Riband of the Atlantic " had been safely in German hands for a good ten years, and that the speed of the " Mary" and the " Lucy " had not been equalled until 1929, I think their claim will be allowed.

It is very questionable whether the Cunard would have won back the speed record had it not been for the aid of the Government, who agreed to lend them,

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S.S. "Sicamous"
British Columbia Lake and River Service.

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S.S. "ANGLIA"
Holyhead—Kingstown Service. L.M.S. RAILWAY.

on very easy terms, a good deal of the first cost of the fliers.

The record breakers were sister ships, but whilst the *Lusitania* was built on the Clyde, her rival came from the Tyne. They had a length of 780 ft., beam 88 ft., depth 60½ ft., tonnage of 32,000, and greatest of all, engines developing 70,000 horse-power!

In these monsters the Parsons turbine, having been proved on other ships, was now employed in its direct form.

To realise fully what the one-and-a-half knots extra speed over their German rivals meant, we can note that, to get it, the horse-power had to be doubled, and the coal required leapt up to 1,000 tons a day.

Since the War such speed has not been aimed at (except in the case of the German fliers to be noted later) because of the enormously increased running cost, and especially the enhanced price of coal. The *Mauretania*, and practically all new ships, are now oil burners, but whilst there is some economy in this, especially in getting

aboard and in stoking, oil is expensive, and it is probable that the increased demand will considerably enhance its price.

Before I give you fuller details of these ships, let me tell you something of their work—during the pre-war period in the case of the " Lucy ".

The first great feature of their running was that the Cunard were able to save a vessel on their express service. Instead of four ships, three would now do. This rendered a great economy possible at once, since not only was it unnecessary to replace the burnt-out *Lucania*, but there was all the saving in crew and upkeep. So that we find our fliers had no longer a week's rest at either end of their trip, but they had to make a quick turn round and be off back.

The usual procedure was to run from Liverpool on the Saturday and arrive at New York on the following Friday, discharge passengers and cargo, coal up, load up again, and start back the following

Wednesday, arriving at Liverpool the Tuesday following, repeating the New York operation, to sail again on the Saturday. In the case of the *Campania*, a day longer in the crossing each way was necessary, so the poor old girl had a couple of days less resting, but the extra work seemed to suit her health, for we learn that, as years went on, her speed increased though she was never converted to oil burning.

In 1911, under this quick-turn-round arrangement, the " Lucy " accomplished sixteen round trips, and then she would have the usual month lay up for complete overhaul and dry docking, which all liners have. And that her speed was appreciated is proved by Mr. Talbot's note in his " Steamship Conquest of the World," that one day the *Lusitania* and another 20-knot liner left New York within a few hours of each other. Whilst the Cunarder had about 1,000 passengers, the slower boat had less than 200!

Until the War the twins and the old *Campania* ran their regular and efficient service (the *Campania* giving way in May, 1914, to the newer and larger *Aquitania*), and it is safe to say that the Cunard was considered the premier Atlantic service, though their great rivals, the White Star, had surpassed the Cunarders in point of size. Then came August, '14. Whilst the " Mary " was withdrawn for naval duty, the " Lucy " was unfortunately continued on her passenger trips.

It is said, and I believe it to be perfectly true, that the Germans had decided from the first that these two fliers should be sunk at all costs, and they laid their plans accordingly. They found it difficult to secure the destruction of the " Mary ", since her movements were uncertain. She was employed in so many different ways, but, trusting in the " Lucy's " fleetness, the Government allowed her to continue on the Atlantic service with her sailings duly advertised.

So sure of their prey were the Germans that they warned intending passengers not to travel on her if they valued their lives. And so sure were our people of her superior speed that they took little notice of these warnings, and, worst of all, on a May day in 1915, her captain was instructed to proceed at reduced speed as she approached the Irish coast. Then came the swift tragedy and one of the two finest steamships we had ever produced was sent quickly to the bottom with over a thousand inoffensive men, women and children.

But the going of poor " Lucy ", more than anything else, brought America into the War. Projects have been made for raising her, but it is questionable whether the thing could be done, or if done what return the salvors could expect. Her hull would be beyond repair, and there was no such golden cargo aboard her as when the *Laurentic* was sent to the bottom off the north of Ireland. So ended the gallant *Lusitania*, mourned by all ship lovers,

representing, too, the best of British workmanship and design.

The " Mary ", which had shared her labours before the War, did yeoman service in those dark days, acting as armed cruiser, hospital ship, and transport. After the Armistice she came back to her normal duties. Soon after her return to service she was considerably damaged by fire. It was just one of those things which happen to any ship, and certainly a strange repetition of what had befallen the *Lucania*. The result was that the *Mauretania* went back for a time to her native river, where many alterations were made, not the least being the adaption of her furnaces for oil-firing, an adaption which enabled her passenger quarters to be substantially increased. Since then the " Mary " has delighted her old friends by her splendid performances, reaching even better speeds than in her early days, and though she is now the smallest of the trio of fliers which maintain the proud place the Cunard have

attained on the Atlantic, she is probably still the favourite, even as she is still the fastest.

During several winters the "Mary" was specially chosen to make the trip to the Mediterranean from America, and she was described as the "millionaires' ship", so rich were her passengers. She proved a great favourite.

Since the War a big, fast liner scarcely pays her way on the Atlantic route in the winter months, and it is becoming increasingly the practice to withdraw them, smaller and less speedy ships taking their place. It is better to employ the fliers on a winter cruise if possible than to lay them up.

The *Mauretania* is such a remarkable ship, and is so representative of the best ship-building practice, that I propose to tell you as briefly as possible something about her before passing on to speak of her successors, which, though larger, are substantially the same in all vital

particulars. I am specially privileged in this as the builders, Messrs. Swan, Hunter and Wigham Richardson, Ltd., have kindly sent me details. The engines are specially interesting to my readers, so we will take them first.

Unlike their predecessors, and many successors, the Cunard fliers depended entirely on turbines, whereas on many vessels a combination of turbines and reciprocating engines was installed. There are six turbines to drive the four propellers. The turbines are divided up in the following fashion. Two high-pressure turbines drive the two wing propellers; two low-pressure turbines the inner pair of screws; and another pair of turbines are used for going astern. The turbines are placed in watertight compartments, so that the flooding of one division would not necessarily place the ship out of action. The weight of the high-pressure turbine rotor is 72 tons, the turbine having a diameter of 8 ft. The low-pressure turbine rotor is

heavier still, weighing 126 tons, whilst its diameter is 11 ft. 3 ins.; the astern turbine has a diameter slightly in excess of the high-pressure machine. There are over 800,000 blades in the six turbines. The huge propellers are of manganese bronze, the blades being built up to the boss. This is considered advantageous, since, if a single blade becomes damaged, it is not necessary to detach the whole of the weighty mass.

There were originally 23 double-ended and two single-ended boilers, the former having four furnaces at either end. These required 6,000 tons of coal on each trip across the Atlantic.

What this means really may be better visualised by imagining 22 train loads of coal, each train made up of 30 trucks. No wonder the Cunard were glad to have liquid fuel delivered from oil tankers which can lie right alongside and pump the oil straight into the tanks. Think of the mess saved, apart from the fact that

the black squad can be reduced to quite insignificant proportions. The coming of oil, whilst doubtless throwing many of our colliers out of work, has conserved our supply of the precious mineral.

We must not overlook the immense number of auxiliary engines at work on such a ship as the " Mary ". There are 66 of these alone, and their duties range from running dynamos for lighting and other work, to pumping air throughout the ship, and also pumping oil to keep the turbines from running hot. The auxiliary engines also operate the water-tight doors, which, by a single lever from the captain's bridge, can be entirely closed throughout the ship.

There are also flushing pumps, and others for operating the fire appliances. Nor must I forget to mention engines for operating the huge rudder.

With that brief description of some of the wonders of the " Mary ", I must pass on to the next entry on our " family tree ",

which, you will see, is "*Olympic*, 1911." The White Star Line had already been impressed with the big ship, and they doubtless felt the severe competition which the two swift Cunarders put up. The directors decided, however, that whilst a bigger ship than these might well be warranted, the extra cost involved in the faster speed was not altogether worth while. The *Olympic* appeared in 1911, and the sister ship *Titanic* a year later. These vessels had a length of 882½ ft., beam 94 ft., and tonnage 45,000. They were able to carry 3,346 passengers and crew, besides having a cargo capacity of 6,000 tons.

Harland & Wolff were, of course, the builders and designers, and, unlike the Cunarders, the propelling force is divided between turbines and reciprocating machinery of the quadruple expansion type. These develop 30,000 horse power, whilst the turbine of the low-pressure type uses the steam after its work

has been done in the cylinders, and adds another 16,000 horse-power. It will be seen that the total horse-power closely approximates the tonnage, so that we may say that each ton of the vessel has one horse-power allotted to it for driving purposes. The average speed is 22½ knots, which made them quite speedy boats, without in any way competing with the Cunard fliers.

These two ships were intended to take the place on the Southampton-New York service of the *Majestic* and *Teutonic*, whose heads might be said to be greying in honourable service. As a matter of fact, the *Teutonic* was withdrawn and went on to the Canadian service, where she did well until the War, but the splendid *Titanic*, on her maiden trip in April, 1912, crashed into an iceberg, and sank within a few hours despite the care lavished on her construction with its watertight compartments. The story has become an epic of British bravery, men and women waiting

their fate whilst the gallant ship sank slowly under their feet.

The going of the *Titanic* led to the immediate laying down of a successor, the *Britannic*, which was rather larger, and was on the stocks when the War broke out. She was ready in 1915, but never took her place in the Atlantic service. I saw her moored in Spithead in July, 1916, and admired her splendid proportions. I wondered how she would fare, and, with regret, learned that a few months later she was sunk by a mine in Greek waters whilst engaged on War service. It would have been much better to have kept her in the Solent as a huge floating hospital.

The big ship was very unfortunate in these years for we see that out of six vessels exceeding 25,000 tons, three of them were lost.

Soon after the *Olympic* was in service, she was eclipsed in size by the German *Imperator*. By the irony of fate the nation who so wantonly sank the " Lucy " have

had to replace her by this fine ship, which was their boast a few years ago. Under the name of the *Berengaria*, the erstwhile *Imperator* shares the express service with the *Mauretania* and the *Aquitania*.

XIV

THE MODERN LINER

We are now getting to the end of our " family tree ", upon the liner side, indeed, there are only two entries, the *Leviathan*, 1923, and the *Bremen*, 1929. Strictly the *Leviathan* ought to have the date 1914, since that was the year of her coming into service under the name of *Vaterland*. She was practically a sister ship of the *Imperator*.

At the outbreak of the Great War, the *Vaterland* had reached New York and there she was interned by the Americans. So soon as the Germans realised that America was coming into the War, they got aboard the *Vaterland* and other German liners which were laid up at New York, and wrecked completely the propelling machinery. The Americans, however, got

to work and made good the damage, and it was a strange turn of fate that the *Vaterland* which was designed to secure American tourist traffic to and from Germany, was employed to take American troops to fight upon the western front. She served splendidly during those critical years, and after her service as trooper she was handed over to the United States Lines, and was practically rebuilt, coming out as the *Leviathan* in 1923. From then she has gone to and fro receiving a great deal of patronage from the American tourists to Europe. At the moment two similar vessels are being built to share a weekly service with her to Southampton.

A third mammoth liner was under construction in German yards when War broke out, this was to have been known as the *Bismarck*, and she was even larger than the *Leviathan*. Now here is a strange fact, the *Bismarck* became the White Star *Majestic*, with a tonnage of roughly 56,000, but the *Leviathan* which had been the

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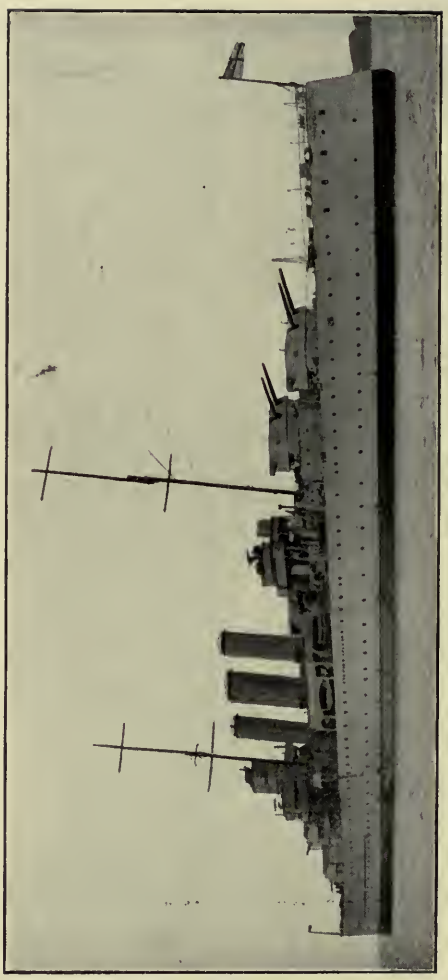
"Crested Eagle"
Paddle-steamer. London to Margate Service, Passenger Accommodation 1,800.



H.M.S. "Cornwall"
Laid down March 11, 1926.

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Vaterland, and was a slightly smaller vessel is now claimed by the Americans as the biggest ship in the world with a tonnage of over 59,000. This is explained by the fact that in her re-conditioning the *Leviathan* had some super-structure added which is included in the gross tonnage, but which under British measurement is excluded, so that two great nations and fleets both claim to have the biggest ship in the world, which is rather confusing to the average person. There can be no question that in point of measurement the *Majestic* is the largest ship.

The Germans had also building the *Columbus*, a twin screw vessel of 34,000 tons. She had to be handed over under the reparations agreement to the White Star Line, and she is now the *Homeric*, and a very favourite ship, though not so fast as the *Olympic* and *Majestic* with whom she shares the service.

The French have also taken a considerable hand in the development of the

Atlantic Ferry, and for many years now the C.G.T. often called the French Line, has had a magnificent fleet of fast comfortable vessels. Amongst their most modern ships are the *France*, a four-funneller, which came out a few years before the War, the *Paris*, and the *Ile-de-France*, both of the latter are three-funnellers, and extremely fine ships, the *Ile-de-France* being practically the same tonnage as the *Olympic*. They are now building a 60,000 tonner, which will be driven by turbo-electric engines.

Germany quickly recovered from her huge loss of liners which had to be given up as part of the reparations levied upon her. In one sense it was an extremely good thing for the Germans that Britain and America did secure many of her liners, for it enabled her to begin afresh and to plan without any regard to what had gone before.

A second *Columbus* was built, and several other very fine steam and motor

liners of roughly 20,000 tons have come into service. The greatest of all her attempts at recovery is shown in the provision of the *Bremen* and *Europa*. The *Bremen* was first in service in 1929, and she promptly took the speed record from the splendid old *Mauretania*. In size the *Bremen* and *Europa* are the equivalent of the *Aquitania* and *Olympic*, but in point of speed they are considerably in advance of the *Mauretania*, having reached over 29 knots for twenty-four hours on end. Both these ships secured the speed record on their maiden voyage, this a remarkable circumstance; as a rule a ship taking a few trips before she does her best. There are one or two outstanding features of the new German boats, first in that they are designed on what might be called a cutter model, then the huge squat funnels suggest motor ships, but actually they are turbine driven with water-tube boilers. When seen in a floating dock one notices at once the bulbous bows under the water

line, and at first sight they would appear to be against speed, but it was an invention of an American naval man, and it has been found to help the ship to attain a great pace.

Up to the present there has been no British reply to these fast German ships; indeed, since the War our companies have largely rested upon their laurels. What replacements were necessary in the fleets, apart from the mammoth vessels obtained from Germany, have been made by what we may term the average size liner, that is to say, ships of 20,000 tons and moderate speed. The Cunard built several with this tonnage, and they are excellent ships in every way, but by no means record breakers.

Curiously enough, on other seas an approach has been made to Atlantic dimensions, speed and comfort, thus both the P. & O. and Orient Lines have produced very fine steamships with a tonnage of 20,000, and a speed of 20 knots. Time

was when the tonnage and speed of a ship off the Atlantic were always considerably inferior to that found upon this ocean. Now with the deepening and widening of the Suez Canal it is permissible to build ships of 20,000 tons.

In many cases the 20,000 tonners are now driven by motor engines, but so far the P. & O. and the Orient have stuck to steam, whilst the R.M.S.P. and the Union Castle have both swung over to the internal combustion engine.

This is a book on the steamship, and therefore we shall not deal with the motor vessel here, but there is still another development on the steamship which needs noting, and by many experts it is believed that the experiments now being made will possibly revolutionise the whole practice so far as steam is concerned.

We referred to the turbo-electric liner which the P. & O. have tried very successfully in the *Viceroy of India*, and have now coming into commission two more

similar sized ships with the same propelling machinery. From the point of view of economy it is very effective as the turbines are built to generate electricity which can be stored for use when extra speed is needed. So far as the Atlantic is concerned there is no vessel with this type of machinery, the reason being that the run is comparatively short, and may be maintained at an even speed, but to the East and the Antipodes frequent slowings and acceleration are necessary on account of the conditions which have to be met.

It is unwise to attempt prophesy as regards the development of the steamship, but those who are fond of saying, that like the locomotive it has had its day, are likely to prove wrong.

There is still a good deal to be done in the development of the turbine, and the steam pressure of boilers is constantly being added to, whilst the use of pulverised fuel, though in its experimental stage, may prove to be a determining

factor as to whether the majority of ships shall be steam or motor driven in future. In point of economy at present the motor ship has it, especially where high speeds are not demanded, but if it is possible to perfect a system of firing by pulverised coal, not only will the collieries of Britain be benefited, but we shall not be dependent upon foreign supplies for ship fuel.

XV

THE LESSER STEAMERS

THE icebreaker is a vessel with a very strongly built hull, and is used in the Baltic and Arctic ports of Russia. Usually they are built in Britain, many of them coming from the Tyne.

This class of ship is not intended to break the ice, which makes the port useless during the winter months—the task would be too great for it. But at the beginning of the winter a passage may be kept clear for a week or two after the frost has set in, and in the spring this powerful ship will smash its way through the ice directly there are signs of it giving; thus a port may be used about a month longer each year than would otherwise be the case.

The powerful bows of the icebreaker are shaped in such a way that, when driven forward, the hull mounts the ice, and the great weight of the ship causes it to weaken when it does not actually give way.

Once a start has been made, a way is forced right through to the open sea.

Of all the little ships, perhaps the tug is the most popular. She goes boldly out to the help of her much larger sisters; she helps them into and out of port; she takes them in tow when they are disabled; indeed, there is nothing that a tug will not tackle.

Naturally enough, the tug is practically all engine, and, more than anything, she would depend upon her engines for her own safety in a heavy sea. With hatches battened down, and the powerful engines doing their best, the tug goes through the worst gale.

Twice recently three tugs have done wonders in towing. On the first occasion they took a big floating dock, surely the

most unwieldy tow imaginable, right across the Atlantic, down one side of South America and up the other, rounding the dreaded Cape Horn.

Later, some Admiralty tugs took an even larger floating dock round to Malta, a journey not so far, but dangerous in the extreme, with the Bay of Biscay to be crossed and treacherous currents encountered off the coast of Spain.

The tug may be seen at its best when a party of them takes charge of a big liner, and tow her from the loading berth into the fairway.

They not only have to tow her, but some of them actually dig their noses into the side of the mammoth liner and push her out.

Then they seem to run round the liner and fasten on her at a fresh place, to give a tow after a push.

The latest feat of the tug family is the taking out of the huge floating dock for the Singapore naval base to its resting-place. The contract was awarded to a

Dutch firm, and has recently been completed. The floating dock was so much bigger than those already mentioned as being sent overseas that it was necessary to send it to sea in sections.

The Dutch are celebrated for their ocean-going tugs, and they have secured many contracts that ought to have gone to British vessels.

A few years ago the *Mauretania* was lying helpless at Southampton with turbines dismantled. Nor could they be placed aboard again owing to an unfortunate strike.

It is obvious that such a ship cannot be spared from service longer than absolutely necessary, therefore her owners decided that she must be towed across the Channel and the refitting given to a French yard. It so happened that the tow was undertaken at an unfortunate state of the weather, and the fine old liner was almost lost as she approached the French coast.

Only by the steady persistence and the excellent management of the tugs in charge

of her was the *Mauretania* able to reach dock; at one period of the passage it seemed certain that she would go ashore and become a total wreck.

Britain still builds steamers for service in America, and the best examples are those which are sent across the Atlantic for duty on the Great Lakes. Here again, we have several distinct types. There is the purely passenger type, with many decks, and cabins which have full views for the scenery passed; there are massive freighters for the ore traffic of the Lakes, and there are what we might call the composite ships, i.e. those which provide for passengers and cargoes.

Quite long voyages are undertaken, since the Lakes are linked by means of canals, and it is through these that many of the ships sent out from England are passed to the Lakes.

Sometimes it is necessary to build the Lake steamer in sections, assemble them here for the trip across the Atlantic, and

then divide them into watertight sections, so that they may be towed through the canals which link the lakes with the sea. The ships which have to be so divided are the larger types; the smaller can pass through the canals under their own steam.

Then again, the British-built steamer is seen upon the vast inland lakes of Africa —lakes which have no connection with the sea. Here the steamers must be of moderate size, built in sections which can be transported easily, and then re-assembled on the shores of the lakes.

The cargo ship has evolved steadily from a small, inefficient tramp to a vessel of large tonnage equipped with all the latest deck apparatus for unloading and loading. Her engines, whilst strictly economical, are both powerful and speedy, many of the more important freighters having a speed of 14 knots, which is only slightly less than many a liner.

Many of the cargo ships are better described as cargo liners, since whilst the

bulk of the accommodation is given to freightage, they have very comfortable accommodation for a limited number of passengers; these are usually carried in a single class. Many of those employed in the frozen meat trade would have been thought huge vessels on the Atlantic only thirty years ago. The cargo ship has also evolved in special types, such as the turret ship, where the plan of the hull is very different from that usually found. This has been done to get an unbroken space of considerable size for the cargo, quite clear of bulkheads and other encumbrances.

The train-ferry is another rather out of the ordinary type of ship, and their use is being steadily extended. At present only a small fleet works from Britain to Zeebrugge, but it is very possible that their use will be extended in the near future, since the ability to take loaded wagons, so saving transhipment, is proving of considerable utility.

The cable ship was at one time a converted liner, but now it has become a specially designed type, its hull so divided that it can carry an enormous amount of cable, involving the laying of several thousand miles without a return to port.

Amongst the smaller steamers the trawlers and drifters employed in fishing must take a very high place. No stouter ships ever go to sea than these. It is said that whatever the weather, whatever the gale warnings may be, out they go and for a fortnight or more, for the short voyage ships, they are hard at work. Others penetrate the Arctic regions, their men suffering terribly from the cold, but rarely giving up the sea despite its inclemency.

The fishing fleet under steam is comparatively a recent innovation, and we may well be glad that the change over has been made, much as we must regret the passing of sail; under the latter the death roll was many times what it is to-day when far more vessels and men are employed.

"Miniature liners" the cross-channel steamers have often been called, and not without reason, for they have the speed and much of the comfort of the greater ship.

In tonnage they run anything from 1,500 to 3,500, and it is interesting to recall that not so very many years ago a ship of 3,500 tons was considered quite big enough for the Australian services.

The fastest cross-channel ships are those employed on the Irish services where a speed of 25 knots is stipulated and attained by the fine post-war boats of the L.M.S. When we recollect that only the *Mauretania*, *Bremen* and *Europa* are faster amongst the Atlantic liners, it will be appreciated what tremendous advances have been made in these splendid little ships. Little is here used in a comparative sense when contrasting them with the huge liners just mentioned.

THE END

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Nancy Delves

THE FOURTH FORM. Mona Rhodes begins her life at school by hating and quarrelling with her popular cousin, Allison, but Nonie Shields the merry madcap of the Fourth Form becomes her inseparable chum, and Mona enters with zest into Nonie's hilarious schemes. Nonie is determined that the cousins shall be friends and at last the two are united, much to the delight of their chums.

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SYLVIA SWAYS THE SCHOOL. Pauline, the leader of the old girls, decides that the new girls must be made to obey the tradition of "Jo's" and kept in a secondary position in the school. But she did not know Sylvia Dare, who by her unfailing good humour, sportsmanship and unselfishness won for the new-comers the respect of all.

PRUNELLA PLAYS THE GAME. Prunella Prendergast was quite unlike the orthodox nervous new girl, and although her elder cousin welcomed her arrival, her younger cousin was jealous of her success at work and games. But the way in which she played the game, won her formmates' hearts and at the end of her first term one and all voted her a "good sport."

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A SCHOOLGIRL'S SECRET. This is a story of a girl who paid for her own schooling by writing short stories. She had promised not to reveal her secret, and had to endure a good deal from the curiosity of the girls and the suspicion and measures of some of them. But she had some good staunch friends who stuck to her through thick and thin.

BOYS' BOOKS, 2/6 *net.*

R. M. Ballantyne

THE YOUNG FUR TRADERS. When he was a boy, sixteen years of age, Robert Michael Ballantyne was employed as a clerk by the Hudson Bay Fur Company. He went into Canada, to Rupert's Land, the name given on the formation of the Hudson Bay Company, in the year 1670, by Prince Rupert.

THE CORAL ISLAND. One of the finest boys' stories ever written; The thrilling and joyous adventures of the castaways, Ralph, Jack, and Peterkin on their romantic desert island will never be forgotten. No boy's reading is complete before he has discovered Ballantyne's wonderful yarn.

MARTIN RATTLER. Many of the adventures in this story befall the hero in the romantic forests of Brazil; but before these experiences there come a sea voyage, an encounter with pirates, a wreck, and other thrilling incidents. It has always been a favourite book with boys.

R. L. Bellamy

THE ADVENTURES OF SCOUT GREY. Scout Grey was a scout of the first water. He was more than a scout, he was also a clever amateur detective; and his pluck and ingenuity in unmasking "wrong 'uns," to say nothing of breathless adventures, will delight all boys, whether they are scouts or not.

SCOUT GREY: DETECTIVE. There is a baffling mystery about beautiful old Barnett Farm that nobody can unravel, and is the cause of a whole party of holiday guests having to leave precipitately. But Scout Grey is not easily scared, and stays on to solve the mystery once and for all.

Lucien Biart

FROM LABRADOR TO MEXICO. This story takes us into many lands, among all kinds of interesting and strange people. The young man had anything but a dull time, and encountered a great variety of experiences and adventures.

H. Turing Bruce

THE SCOURGE OF THE MOORS. Raoulf de Gyssage is a hunchback. When he is about 15 he sees his brother killed in a duel by one, Sir Nigel de Flers, and vows to be avenged on the slayer. He runs away from home, goes to the wars, and has many a marvellous adventure.

Harcourt Burrage

THREE CHUMS. The three inseparables were disgruntled because they had been moved from the cock house to a new house, and determined to slack both in work and games. But they grew sick of idling, and the new term found them inwardly rather ashamed of themselves.

D. M. Callow

TOBY IN THE SOUTH SEAS. Toby and Jerry were twins who went to live on a South Sea island with their parents and two sisters. The whole family fairly revelled in the very different life, and the adventures of the two boys make very exciting and interesting reading.

F. Carlton-Wiseman

ONE EXCITING TERM. And a truly thrilling term it was, with enough excitement to last most boys a lifetime. Boy Scouts (and all other lads, too) will revel in this story of mystery and pluck and adventure.

Harry Collingwood

UNDER THE METEOR FLAG. Ralph, the hero, is one of the most dashing midshipmen who ever breathed. His adventures on secret service among the Corsicans and French, and his cuteness in surprising forts and warships lead to early promotion.

George Cupples

THE GREEN HAND. Starting as a very green hand, he soon became as smart as paint. Later, when sailing as a passenger, he takes command in an emergency, and returns home in charge of a prize captured by himself.

Chas. Edwardes

THE NEW HOUSEMASTER. Who was he? The boys didn't know, nor the headmaster, nor the police. But the gang of coiners knew, and used the boarding school to cover their operations. Eventually they made good their escape. How was it done?

H. Elrington

THE OUTSIDE HOUSE. Harry Vereker's father having died, his rather mean uncle sends him to a big public school, but enters him at "Pugsleys." It is in rather bad odour, and most of its members feel themselves despised by the rest of the school, who call them "Pugsley's Paupers." But Harry brings a new spirit into it, and the story of how the outside house "makes good" is very interesting reading.

R. A. H. Goodyear

ALL OUT FOR THE SCHOOL. Much fun is caused by the arrival at Wolverton School of twin masters, who add zest to the life of the school. There is much fun in this tale and some stirring accounts of Soccer matches. Mr. Mellowship, a master known as "Ship Ahoy!" is most popular and proves a marvellous football coach.

STRICKLAND OF THE SIXTH. Owing to its comparative inaccessibility on top of a hill, Hanenhall School has fallen on bad days, there being only about a quarter of the number of boys it could accommodate. But "Strick," the captain, determines to make things hum. How he does it so that three hundred new boys are expected by the next term is a very interesting story.

THE HARDY BROCKDALE BOYS. Brockdale is proud of being known as one of the most robust public-schools in the country. It looks down with pitying contempt on a neighbouring school of delicate boys. Healthy sport and bright doings at Brockdale are spiced by a series of mysterious adventures, and a way is found in the end by which the Brockdale boys may meet the once-despised school on level terms.

J. Percy Groves

CHARMOUTH GRANGE. Philip Ruddock was a truly villainous villain. He caused his old kinsman to be poisoned, and tried his best to do away with the young heir so that he himself might own Charmouth Grange. But young Ronald Cathcart, with tremendous pluck (and no little luck), came into his own after many vicissitudes and hair-raising adventures.

Bernard Heldman

MUTINY ON BOARD THE "LEANDER". This book is packed with thrills of all kinds. The men of the "Leander" were a pretty rough lot, but their "coup" brought no good either to themselves or the few honest men on board. Fire, shipwreck, savages, pirates, slavery, and final escape all tend to make breathless interest for boy-readers.

G. A. Henty

THE CORNET OF HORSE. This fine story of the gallant days of old, traces the career of the hero from his first lesson in fencing until he becomes one of the finest swordsmen in Europe. He ruffles it with Marlborough in England, France and Germany.

JACK ARCHER. A midshipman in the Crimean War is captured by brigands at Gibraltar and held to ransom, but escapes. He takes part with a Naval Division at Balaclava and covers himself with glory.

WINNING HIS SPURS. The story of an English lad who won his spurs after many wonderful deeds and hairbreadth escapes during the Crusades. Not dry history, but a series of glorious adventures.

Kit Higson

THAT SURPRISING BOY, SPINKS. They were a jolly lot of youngsters, but harried by a big bully, until "that surprising boy" arrived; and the *most* surprised person was the bully, who found he had met his match. Jimmy Spinks and his special chum, Jack Taylor, are two fine little chaps, and their adventures will delight boys.

George Gibbard Jackson

THE QUEST OF THE OSPREY. The story of the hunt for a mine of fabulous value, both an English captain and a Frenchman being very keen. Two boys who stowed away on the Englishman's ship come in for any amount of excitement and danger and adventure. A thrilling story for boys.

Arthur L. Knight

IN JUNGLE AND KRAAL. The adventures of two young midshipmen in the jungles of Ceylon. Immediately on landing at Colombo from their ship, they fall into thrilling adventures, lose their horses and nearly their lives! An expedition into the jungle is planned, and, after many adventures they assist in the capturing alive of a herd of elephants.

Andrie Laurie

THE CRYSTAL CITY. "The Crystal City" is a fantastic tale of a young midshipman, who, washed overboard in a storm, finds himself in a wonderful glass city under the sea; its only occupants being an old man and his beautiful daughter. The mystery of their existence there, and the result of the young sailor's visit make a very interesting story.

J. Macgregor

ONE THOUSAND MILES IN THE ROB ROY CANOE. This is the log of a charming cruise in a small canoe, designed by the writer. With paddle and sails he traversed the rivers Thames, Sambre, Meuse, Rhine, Main, Danube, Aar, Ill, Moselle, Meurthe, Marne and Seine, and Lakes Titisee, Constance, Unter See, Zurich, Zug, and Lucerne, together with six canals in Belgium and France, and had two expeditions in the open sea of the British Channel.

Peter Mael

UNDER THE SEA TO THE NORTH POLE. A thrilling story of adventure in the Arctic regions, with hardships galore met with pluck and endurance. Mutiny and treachery have their part, and strenuous fights with polar bears, and dangers of all kinds.

Captain Marryat

MR. MIDSHIPMAN EASY. Before he began to write books, Captain Marryat had a share in many hard-fought battles at sea. He sailed as a midshipman under Lord Cochrane, and spent years in dangerous service off the French and Spanish coasts. Marryat served many years after this, and was the hero of many exploits that had been embodied in his works. Critics agree that "Mr. Midshipman Easy" ranks among Marryat's very best.

Herman Melville

MOBY DICK. Here we have a moving book which could have been written only by a writer of genius who had lived a life of peril. Such incidents as these could not have been invented. Herman Melville went upon a whaling expedition, and we have the result in these stirring pages. The sense of reality is wonderful, and the tale made the writer famous all over the world. It is now a classic.

Sam Noble

'TWEEN DECKS IN THE 'SEVENTIES. A book that any boy worth calling a boy will delight to read and have for his own. It is a truly fascinating account of life in the Navy when Sam Noble was young. Simply yet forcefully written, every line is a joy.

G. Norway

RALPH DENHAM'S ADVENTURES. A tale of the Burmese jungle. A boy sets out from his home to take up work in Burma. His adventures begin early, for his boat catches fire and sinks. The firm for whom he was to work in Burma fails, and he is cast upon his luck. He travels through the jungle, has many adventures, and finally makes good.

Michael Poole

UNDER RINGWOOD'S RULE. Jackson Wrexham, the son of an American millionaire, is sent to Ringwood School where he strongly resents the discipline imposed and quite fails to understand the team spirit. He has a great number of scrapes and even tries to run away from school. Eventually, being a good swimmer, he wins an event for the school and at last settles down happily.

Louis Rousselet

THE SERPENT CHARMER. A French gentleman and his boy and girl fall under the displeasure and into the power of a great Indian Prince. Andre, the son, escapes, and disguised as a young native has many adventures, and is finally reunited with his family.

J. G. Rowe

ROUND THE WORLD WITH DRAKE. A story of Sir Francis Drake's voyage round the world in "The Golden Hind," of the voyages, many and adventures, victories with the Spaniards, endurance, of storms and hardships and triumphant return to Plymouth, to say nothing of the special exploits of a charming young hero.

W. Clark Russell

THE FROZEN PIRATE. Paul, a sole survivor, finds, stuck fast in the ice, an old ship. On board is the frozen form of an eighteenth century pirate, whom Paul brings back to life for a while, and eventually gets both ship and treasure home intact.

THE SEA QUEEN. A tale of the sea and seafaring people, told by a girl, Jessie, who married Richard, a captain, and goes with him on an adventurous voyage. It includes a mutiny, a ship on fire, and the wonderful salving of another vessel that provides them with an ample reward.

W. Clark Russell

THE WRECK OF THE "GROSVENOR". Recognised as one of the greatest stories ever written. The unforgettable story of the mutiny on the "Grosvenor," out from England, the sailing of the mutineers for Florida, how the hero, with a couple of seamen, tricks them and takes the "Grosvenor" along till she sinks, the taking to the boats, and the final rescue.

A SAILOR'S SWEETHEART. Will goes off on his last voyage before becoming first mate. Unknown to him his sweetheart Nellie books a passage by the same boat. The captain goes mad and hangs himself, whilst Will, Nellie, and three sailors, are wrecked, but manage to bring home a valuable waterlogged vessel.

JACK'S COURTSHIP. Jack's girl friend is sent on a voyage. Disguised, he sails in the same ship. His rival is no sailor, and leaves the ship in disgrace. In dire peril, Jack takes charge so capably that he overcomes all opposition and wins his bride.

Michael Scott

TOM CRINGLE'S LOG. The author of these moving adventures was a University man who went to Jamaica and the West Indies as a planter. By his keen observation he collected the materials that he used in this sprightly book. The book is packed with incident, the style is lively and full of fire, so that this story has remained very popular ever since its appearance in 1833.

Jules Verne

THE ABANDONED. This is the story of the mysterious island upon which the castaways were "Dropped from the Clouds" and also the story of a neighbouring island that proved even more of a mystery. On this second island they find "The Abandoned," a man with a strange history, which the story relates.

ADRIFT IN THE PACIFIC. Just the book for boys! A party of school boys suddenly find themselves adrift on the mighty ocean. They are wrecked on a lonely island. How do they fare? What can they do? Read how they set up a little colony and governed it, how they hunted, fished, explored and finally overcame some murderous mutineers thrown ashore on the coast of their little island.

AROUND THE WORLD IN EIGHTY DAYS. Phineas Fogg, for a wager, attempts to make a circuit of the earth in eighty days. It is a case of whirlwind travel, and the story of the journey goes along with a rush of excitement. Adventures crowd upon Phineas ashore and afloat, enemies try to thwart him, accidents delay him, and he returns to London just too late, and yet in time! Therein lies a puzzle.

THE CLIPPER OF THE CLOUDS. The most wonderful aeroplane that ever navigated the air, and yet it was invented in Verne's magical brain long before the first airman set his propeller whirling. Captain Robur does what no airman can do to-day, and the story of this world-wide voyage is one continuous thrill.

THE CRYPTOGRAM. This was the secret document, written in a difficult cypher, which proclaimed the innocence of Joam Dacosta, a man condemned to death for a crime of which he was innocent. The story of the trial and the unravelling of the "Cryptogram" at the last moment makes an enthralling story.

Jules Verne

DROPPED FROM THE CLOUDS. Five men escaping by balloon from an American city in war-time, are carried out to sea by a hurricane. After the most acute perils they are cast upon a island far from land. Here the heroes settle, and provide themselves with clothes, food, weapons by a clever use of the natural products of their new home.

FLOATING ISLAND. An artificial island, four and a half miles long and three broad, is made by an American multi-millionaire. It contains mansions, parks, public buildings, water supply, etc. Moved under its own power, it travels to many parts of the world. The marvellous adventures of its inhabitants make an exciting story.

THE FUR COUNTRY. An exciting story of the wonderful land of the Midnight Sun. It tells of the perils and excitement of trapping in the Arctic Circle, and the hunting of wapiti and polar bears and silver fox, etc., varied with adventures among icebergs and the great rivers and lakes of the Fur Country.

THE MASTER OF THE WORLD. "Robin the Conqueror" he calls himself, because he considers that the wonderful flying machine he has invented and constructed gives him complete control of the destinies of all nations. But he comes up against John Stock and finds he is not so powerful as he thought he was.

FROM THE EARTH TO THE MOON AND A TRIP ROUND IT. An American determined to pay a visit to the moon; so he built an enormous gun, and a house like a shell, and tried. The results of his experiments are contained in this astonishing book.

GODFREY MORGAN. Godfrey Morgan has everything a young man can want, but he is weary of luxury and longs for adventure. His fond uncle allows him to go off on a voyage with his tutor, a most egregious fool. The ship sinks under them, and the two are thrown upon an island, and have just as much adventure and hardship as they can put up with.

EIGHT HUNDRED LEAGUES ON THE AMAZON. Not merely a description of a journey down the most wonderful river in the world, but the story of a brave gentleman wrongfully accused of a crime, and the schemes of a rascally adventurer to blackmail him and his family.

A FLOATING CITY & THE BLOCKADE RUNNERS. "The Blockade Runners" tells how a grave and handsome young skipper ran a cargo to the American ports during the Civil War, and how he had on board a winning little lady, so that he not only ran a cargo, but brought away an imprisoned father condemned to death, and so won himself a charming bride.

THE ADVENTURES OF THREE ENGLISHMEN AND THREE RUSSIANS. Three Englishmen and three Russians go on a joint scientific and exploring expedition to South Africa. They disagree and separate; natives attack them, and only after many perils do they re-unite in safety.

FIVE WEEKS IN A BALLOON. In a balloon, which had something of the airship about it, the inventor, his faithful servant, and a friend, cross Africa from East to West. Swamps, forests, deserts, savages, fierce beasts, hunger and thirst all assail the intrepid voyagers in turn; but they win through by skill, pluck and endurance.

Jules Verne

TRIBULATIONS OF A CHINAMAN. A rich young Chinaman, finding the future does not attract him, writes an order to his friend to kill him, choosing his own time and method. He then changes his mind and wants to live, but friend and paper have both disappeared, and a wild goose chase with endless set-backs follow.

TWENTY THOUSAND LEAGUES UNDER THE SEA. The masterpiece of all submarines was the one imagined by Jules Verne and constructed by Captain Nemo, the most mysterious sailor that ever sailed the sea. The voyages of this book and the astounding adventures of its crew make it one of the most fascinating stories ever published.

DICK SANDS. When a catastrophe deprives a sailing ship of its captain and nearly all the crew, the responsibility of bringing the ship safely to the end of its voyage devolves upon Dick Sands, a boy of fifteen. He does his best, but treachery results in landing them in Africa instead of the haven they desired, and many adventures befall him and his party.

THE END OF NANA SAHIB. A story of the time a few years after the Indian Mutiny. A party of men travel many miles in a wonderful moving house, drawn by a marvellous steam elephant. Their many adventures and the doings of Nana Sahib, the fiend of the Mutiny, and his final overthrow are very exciting.

THE FLIGHT TO FRANCE. An interesting story of a party of charming French people who are forced to flee from Germany when war is declared between the two countries. They pass through many vicissitudes on the journey. One of their number comes within an ace of being "shot at dawn."

HECTOR SERVADAC. A most astonishing story of the collision between a comet and the earth, full of adventure and excitement, and incidentally, full of information concerning certain heavenly bodies.

THE VANISHED DIAMOND. A fine story of the South African diamond fields and the adventures of a young engineer who attempted the dangerous experiment of trying to make a diamond. There was a diamond and it vanished; but how? Read the story.

THE SECRET OF THE ISLAND. This is a story of mystery, an unseen man who guards the castaways and provides for them. Their attempts to discover the secret are in vain, but at last the Unknown reveals himself as Captain Nemo, the hero of "Twenty Thousand Leagues Under the Sea."

WINTER AMID THE ICE. An ice-bound ship, two deadly enemies aboard, shortness of food, fights with men and polar bears, dangers of every kind possible in the Arctic Circle make an exciting and interesting book for boys and others.

THEIR ISLAND HOME. Jules Verne had such an admiration for the famous book, "The Swiss Family Robinson," that he himself wrote a sequel, and carries the history of the Zermatts considerably further. The book is at least as interesting as the one that inspired it.

THE CASTAWAYS OF THE FLAG. The final adventures of "The Swiss Family Robinson." Here some of the family having visited Europe are on their way back to their island home when they are shipwrecked. After many privations and adventures they get a very pleasant surprise.

Jules Verne

THE LIGHTHOUSE AT THE END OF THE WORLD. Three men are left in charge of a new lighthouse on a lonely island at the southern extremity of South America. A band of pirates have a lair near-by and most exciting happenings take place.

MICHAEL STROGOFF. The greatest romantic writer since Alexandre Dumas, Jules Verne's works have been translated into every language. Michael Strogoff is ranked by critics as one of the finest creations of his pen.

THE MYSTERY OF THE FRANKLYN. The story of Captain John Branican, who set sail for a voyage to the East, expecting to return to his home in six months. But he did nothing of the kind. The story of the various efforts to discover what had happened to him and his ship, with the final unmasking of a villain, will greatly interest boys.

Rowland Walker

THE LOST EXPEDITION. Two boys are allowed to go with a party to search for the members of an expedition that has been lost in the wilds of the Amazonian forests. They have glorious adventures and narrow escapes galore, but all ends well.

MASTER VALENTINE BUCKET. Valentine Bucket was a new boy, but not the ordinary retiring sort of new boy. They all thought at first, that he was a "lout" and a "mug-wump," but he soon showed he was nothing of the sort, and made the whole school "sit up and take notice" from the "Dominus" downwards, especially the school bully.

Lew Wallace

BEN HUR. A tale of Christ. The story tells of the experiences of Ben Hur in the East at the time of the birth of Christ, and the beginnings of Christianity. The tale is written in absorbing style and the daily life and atmosphere of the time are powerfully depicted.

GIRLS' SCHOOL STORIES AND TALES OF ADVENTURE, 2/- *net.*

Louisa M. Alcott

LITTLE WOMEN. This is one of the most delightfully homelike books for girls which have ever been written. The character of Jo is drawn very vividly, and we all grow to love the tom-boyish girl who manages to get into so many scrapes and awkward positions and then get out of them cleverly.

LITTLE WOMEN WEDDED. This is a continuation of the life of "Little Women." Meg, happily married at the beginning of the book, experiences the many trials and amusing difficulties of a young wife. As the book draws to a close we see the "Little Women" changed into "Good Wives" and all ends happily.

Marjorie Bevan

FIVE OF THE FOURTH. A very merry little quartette were gathered in the Recreation Room on the first day of the Summer Term; and in discussing their plans were quite determined that no one should be allowed to share, or spoil, their companionship. But Peggy Lawson, a new, shy girl, intrudes, with the result that they have more fun and adventures than ever.

THE PRIORY LEAGUE. The old school is in danger of being sold because there is no money for repairs. There is an old legend that when the Danes invaded England and sacked the Priory, the founder had hidden some of her treasures. Several of the girls band themselves into a "League," determined to find the long-lost riches. Their adventures and what happened in the end make a truly exciting story.

Jennie Chappell

AILSA'S CHUM. A deeply-moving girl's story. Life proceeds happily and unevenly in the Brereton household until there comes a railway accident and a strange baby is thrust upon the family. Soon after complications begin, and a fine story is unravelled. The story closes with the reunion of two lovers long parted and lost to one another through misunderstanding.

GLADWYN. This book is described by the author as "a circle of fortune," and concerns the adventures of Gladwyn, heiress to a worthless estate. How she faces his difficulties and goes to London and finally finds much love and happiness is told with a swinging style.

M. De Witt

AN ONLY SISTER. Elizabeth and Marc, and Pierre and Henri, were the children of a French gentleman who fell on evil times. After his death the four had a desperate struggle to live, and it was the sister who bore the heaviest burden. But fortune smiled on them at last.

Enid Leigh Hunt

HAZELHURST. Here you have the story of a charming "nut-brown mayde," the youngest of a family, the others all being boys; a delightful group of brothers, who make much of their young sister. There is also someone else, *not* a brother, but equally delightful and interesting. A book to charm and delight all girls.

THE ADVENT OF ARTHUR. Joyce Dayrell and her brother, Jocelyn, in the absence of their father abroad, have to live with relations, who are hard and unsympathetic. Sister and brother decide to go away and fend for themselves. Joyce becomes a teacher in a school, but life is often hard and dreary—until "Arthur" comes.

Bertha Leonard

THE HOUSE OF DOUG. Judith Douglas is the middle member of a lively, rollicking family. Full of life and spirit, and mischief, she is an incorrigible tease, but adored by all the others. There is tremendous excitement when their father inherits a lovely old mansion, with old oak, ancestral portraits, traditions and ghost all complete.

Bessie Marchant

CICELY FROME. The story of a girl, who, a captain's daughter, learns early in life that her father is missing. She goes to Ceylon and has many enthralling adventures, the chief of which is the tracing and rescuing of a stolen baby. Finally, the mystery surrounding her father's disappearance is cleared up.

Irene Mossop

WELL PLAYED, JULIANA! Juliana thoroughly enjoyed her first term at school and made good both at work and games. She was beautiful and charming and very wealthy—her chief friend was a scholarship girl who had no money and no pretty clothes. In the end an exciting secret was discovered that brought them much happiness.

PRUNELLA PLAYS THE GAME. Prunella Prendergast was quite unlike the orthodox nervous new girl, and although her elder cousin welcomed her arrival, her younger cousin was jealous of her success at work and games. But the way in which she played the game, won her form-mates' hearts and at the end of her first term one and all voted her a "good sport."

Mrs. Herbert Martin

THE LONELIEST GIRL IN THE SCHOOL. The story of the Princess Ottilia, who comes from abroad to live at an English school while her father is travelling. Shy and reserved by nature she soon becomes "the loneliest girl in the school."

Sibyl B. Owsley

DULCIE CAPTAINS THE SCHOOL. The story of a shy, diffident girl who was not at all happy when circumstances made her captain. But she faced her difficulties with pluck and came through her dreaded ordeal with flying colours and won the love and respect of the whole school.

Mary Louise Parker

PAT OF THE FIFTH. A quite delightful story of schoolgirl life. Pat O'Farrell is really rather a dear and attracts the love of most people she meets, old and young. Girls will enjoy reading about her adventures and the doings of herself and her friends, both boys and girls.

MOLLIE OF ST. MILDRED'S. Mollie Winfield was one of a family; Chris. Carstairs was an only child, and somewhat spoilt. Both arrived at St. Mildred's, and girls will enjoy reading about their friendships and their work and their play, and their prowess in games and sport generally.

H. B. Stowe

UNCLE TOM'S CABIN. People who were not alive in 1851, when "Uncle Tom's Cabin" was written, will not be able to understand the great excitement caused by this book, both in England and in America; and when the struggle between those who wished to abolish slavery and those who desired to perpetuate it resulted in the American Civil War.

Mabel L. Tyrrell

THE FORTUNES OF THE BRAITHWAITS. A family of four, three girls and a boy, live with an aunt, their parents having died. Their new neighbours at the old Manor House are a source of great interest to them. A most mysterious burglary, the disappearance of Henrietta, are a few among the exciting incidents.

VICTORIA'S FIRST TERM. Victoria Alberta Mackain begins her school life all wrong, and gets out of favour with nearly all the girls, to say nothing of worrying the headmistress. But she soon finds her own place and ends by being recognised as a "real sport."

A. D. T. Whitney

A HEART OF GOLD. Home life in a New England country place; quiet, Puritan folk, living out their lives in traditional manner. The main characters are two girls, one a pessimist and the other an optimist.

OTHER GIRLS. Sylvie Argenter made the discovery that "other girls," girls belonging to other circles, had hearts too. When adversity came to herself, she faced it bravely, and in the end had her reward.

WE GIRLS. The story of healthy, happy life among a family of girls and their friends. Such a cheery crowd they are, in spite of not being blessed with too much of this world's goods. Everybody is glad when a missing paper turns up in a strange way, which ensures that they will not have to leave the old house they all love.

May Wynne

CAROL OF HOLLYDENE SCHOOL. A delightful school story, full of pranks and games and high spirits. There is also a mystery which sets the tongues of the unpleasant set wagging against Carol, but her special chums are loyal and all ends well.

BOYS' SCHOOL AND ADVENTURE SERIES, 2/- *net.*

Harold Avery

A BOY ALL OVER. Fred and Bob, two school chums, who are by no means namby-pambies, have many escapades, but come out on top, largely owing to the hero's sister, who proves a good pal to both.

Tom Bevan

THE HEROIC IMPOSTOR. Henry Borden was an impostor; he took another man's name and place, but how could he help it; so much happiness for other people depended on it. Full of intrigue and danger and tight corners, this book will entrance all boys who *are* boys.

BOB BLAIR—PLAINSMAN. Bob Blair, riding back to his homestead in Australia one day, finds it burnt to the ground, and all his stock stolen. The story of the struggle between Bob, supported by his friends, and Sandy Malone, the bushranger, and his followers is cramfull of thrills.

THE MYSTERY TRAIL. Becoming separated from his party while out on an expedition, Ronald Leslie is surrounded by black men, bound and gagged, and carried away. To his amazement he finds that he has been kidnapped by order of a white man, who is a kind of king in the wild country.

Harry Collingwood

THE WRECK OF THE "ANDROMEDA." A thrilling story of a shipwrecked party, who land on a wonderful island, where strange things happen to them. The moving spirit amongst them is young Massey, one of the ship's officers, whom all boys (and others) will much admire.

THE CRUISE OF THE "FLYING-FISH." The wonder ship that flies high in the air, skims the surface of the sea, and descends to its lowest depths. Its owners hide it under the waters of the English Channel until they need it for their cruise. Their dismay when they discover it has been stolen, and their adventures in recovering it, make an exciting story.

IN SEARCH OF EL DORADO. Wilfred Earle, an American, and Dick Cavendish, an Englishman, set out on an expedition to try and discover the "fabled city" of Manoa, the city of El Dorado. They have the most thrilling adventures, and make the most surprising discoveries.

UNDER A FOREIGN FLAG. The Story of Paul Swinburne, a middy who, through the machinations of his cousin, is court-martialled and dismissed the Service. He joins the navy belonging to another country, and after seeing much fighting, and having many adventures his innocence is established. A fine racy story.

THE VOYAGE OF THE "AURORA." Having suffered a keen disappointment, young Captain George Leicester bought the "Aurora" with his savings and set out on a voyage to Jamaica. He had hair-raising adventures before he got there, and if he wanted something to distract his mind, he most certainly got it.

Harry Collingwood & Percival Lancaster

IN THE POWER OF THE ENEMY. Hugh Marchmont is devoted to his little brother Jack. During trouble with the Zulus the child is stolen by Hugh's arch-enemy and given to the black warriors. The wildest, most hair-raising adventures happen to both brothers before Hugh succeeds in saving the child.

W. Bourne Cooke

THE GREY WIZARD. A thrilling pirate story, with a kidnapped boy, a secret concerning hidden treasure, a truly poisonous villain, treachery, pluck, and a happy ending, all the ingredients for a thoroughly enjoyable boy's story.

J. Fenimore Cooper

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